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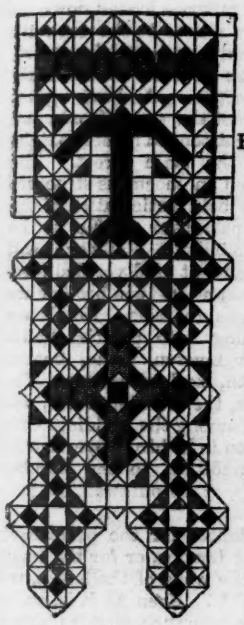

## *Urban Architecture* versus *Street Architecture.*

THE decay of the picturesque element in urban architecture has been long and loudly lamented. It is possible that more cause existed for the complaint four-and-twenty years ago than is the case at present. Whether or no that be so, the general feeling has been by no means dissipated. But we question how far any architect, or any architectural writer, has set himself to probe the question to its core; to inquire, first, into the truth of the complaint, and then, assuming that truth to be clear, to inquire, further, into the cause of the change.

In illustration of the position that there is an absence from our towns of the special form of excellence known as the picturesque,—let us call attention to the view on the Pegnitz, Nuremberg, in a recent number (No. 1920) of the *Builder*. In offering it to our readers we made some remarks on the contrast it presented to much that is going on in the suburbs of London. Let us glance for a moment at the infinite diversity and quaint contrast of sky-line and lines of construction in that view. The picture is full of a vigorous and racy originality. It is the originality of a time when the burghers of a town wore iron by their side, and were by no means unhandy in its use. Look at the doubly-guarded bridge; the strong round tower that forms its outer entrance; itself approached by a wooden structure that seems to have replaced a drawbridge, and which, in case of any attack on the town, could be readily destroyed. The close-covered gallery crossing the river is supported by two arches giving ample waterway for floods, if we may judge by comparing the height of their soffit with the level of the river. Cityward a more lofty and ponderous tower, pierced for culverins, or for other ancient weapons of projectile force, dominates river, bridge, and entrance-turret. Under cover of this castellated building, and throwing down a flight of steps to the river itself, stands a mansion that was built for the abode of some well-to-do citizen. A stout iron cage protects the small windows necessary for the ground-floor. Above, a sense of more security has allowed the architect to think rather of habitation than of defence. A double gallery looks out on the river, telling of times when arms of precision and of long range could not be brought to riddle the palisades, or to sweep them of their occupants. The lofty gable, framed together like a piece of shipbuilding, rises to throw off the winter snow. Behind, the turrets of the church appeal to the invisible guardians of the city; and gables, and peaks, and weathercocks all assert their respective sturdy and substantial individuality.

In all this we see no striving after effect,—no effort to be romantic,—or Classic, or Teutonic, or anything else. In a rude but not ignoble state of society,—it would seem the architect knew what was needed for the burgher and what for the city. With a proper deliberation, and at an ample outlay, he provided what was needed. Hence the sense of fitness and of comfort that the perspective awakens in the mind. The building is picturesque as the reflex and the embodiment of a state of society so far removed from that which surrounds us, that it excites something of the sense of wonder when we regard it. Thus, in spite of simplicity and absence of any attempt at direct decoration, we linger with pleasure over such a view.

We refer to this peep at Nuremberg, because it furnishes a very striking illustration of the difference between urban architecture and street architecture. It is an example of the former. It has nothing to do with the second. We cannot doubt that, whether straight or crooked, there is a street that leads from the bridge to the church. But that street is not the motive or central feature of the scene. It exists as a necessity, not as a pictorial or architectural feature of the town. And so it is in Genoa,—so it was in all those Mediæval cities in which houses rose into inaccessible towers, and personal defence was more studied than freedom of intercourse, or open pursuit of trade.

With those cities that are the offspring of the present time (such as Birkenhead, for example), or in which the requirements of the present time are veiling, if not crushing, the ancient nucleus of city life under an ever-growing skirt of densely-peopled suburb, the case is altogether different. Accommodation for traffic assumes the foremost place. The idea of defence has evaporated. The houses have long lost the character of fortalice, because it is not against the strong hand of rapine or of oppresion that the chief defence is now required. Next, they have lost the character of habitations. For a verandah in which the burgher of Nuremberg might calmly smoke his pipe and look forth on the river, we find substituted as large as possible an area of plate-glass, behind which the merchandise within is made temptingly visible to the passers-by. And so freely is this done, that in many cases there is not even the safeguard of iron bars so set as to prevent any one who broke the windows from making his entrance into the warehouse. A plate of glass, which a glazier's diamond, a pistol bullet, or even a short iron bar sharply applied, would at once shatter, is the sole defence of costly tissues, rich stores, even of gold and silver plate and jewelry. And the architect has, by slow degrees, come to consider this mode of fronting the street sufficient, because behind or without the glass is the invisible but ever-present safeguard of public order.

It will be evident to those who have thus far accompanied us in our reflections, that the passage from one phase to another of civilisation is faithfully represented by architecture. Nor must it be forgotten how hostile are such changes to structural beauty, and to real architectural effect. When a city is rebuilt after a bombardment, or after a fire, there is an occasion given for founding a new architectural order that shall correspond to the new political order. But when the change is insensible, individual, bit by bit, this is impossible. Often, too, in the course of change, something perfectly incongruous is introduced by some personal whim that is alike out of place in itself, and injurious in its effect on the older building. Thus in one of the most picturesque streets in any southern English town, in which houses of two, three, or even four hundred years old arrest the eye of the draughtsman in goodly succession, look at the new Stores!—a neatly stuccoed imitation of two or three Greek temples piled one on the top of another, with fine large plate-glass windows on the ground-floor to act as a *podium* to support the upper orders! Very clean, very neat, very exact, very charming, probably, to the builder; but as atrocious as any jumble could be. And that for the twofold reason that, in a climate like our own, a Grecian temple is not the kind of building in which to sell sugar and bacon; and that, if only shed-room and open window be required, it would be less obnoxious to supply them in the plainest and most unmistakable form, amid a company of Jacobean, Caroline, and Elizabethan houses, than to introduce the smug tidiness of Stuccoville.

It is tolerably certain that while our population increases at its present rate, the true requirements of making straight, wide, and commodious streets to accommodate the ever-increasing traffic of our towns, and at the same time the desire to tempt the wayfarer to become a purchaser by the display of articles in the windows of the houses lining the streets, will continue to control the efforts of the architect. In such a state of things the house will more and more cease to be individual and distinctive. The terrace, or the row, or the front, is all that the artist can hope to modify. In London, under the auspices of Nash and other architects, the first step in reconstruction that was taken on a large scale, since the time of Wren and Chambers, was the erection of Regent-street. As a rule, in London, we seem to have now passed into a stage when the arrangement of the street is admitted (not in every case, but in most cases) to be the first point.

On the Continent, where in many cases the urban builders have been at work as industriously as among ourselves, very much more attention has been given to street architecture regarded in masses and great lines. In Paris, in Marseilles, in Turin, in many other Continental

cities, lines of houses, with shops on their basements, are extending for mile after mile, which have a palatial rather than a petty commercial appearance. It is true that an amount of control is exercised by urban as well as by central authorities in those cities, to which we should no more be ready to submit than to the (to us) intolerable burden of the *octroi*. We are not now arguing either way, for or against, such control. We are only investigating the facts. Urban architecture, in the Continental cities to which we have referred, and in many other cases, has become a special branch of the study of the architect. Not only the accommodation of traffic, but the exigencies of military command have been carefully studied. With the stratigraphic plans thus determined has been associated the conception of noble, and sometimes monotonous, elevations; treating the rows of houses that line the streets in somewhat of a palatial style, and thus producing an architecture which is more truly the child of the nineteenth century than any other mode of treatment or of conception.

Urban architecture of this class is, no doubt, at the same time street architecture. It might almost be named Imperial architecture, when we regard the era of its remarkable development in France. But we are precluded from the use of the term by the remembrance of the noble lines of new street, with arcaded footpaths,—leading to a fountain, or a palace, or some other central point,—which form the new part of Turin. Nor are other parts of the world to be left out of consideration. That the palatial street architecture of the nineteenth century has attained, in not a few instances, great dignity and beauty, no one familiar with Europe can deny. But two considerations have to be borne in mind with regard to it. One is, that there are special causes which oppose its introduction, on any comprehensive scale, into England; the other is that, by whatever term of admiration we may designate it, it cannot be described as picturesque.

What, then, is the real force of that word as applied to architecture? Since the word picturesque was coined, æsthetic study has advanced so far as to demand a new terminology. Thus, side by side with the more racy term, we have the Latin-like adjective, "pictorial." Both words mean "like a picture"; and yet they are not applied by the artist or the art-writer as convertible terms. We attach an idea of more stately dignity to the word "pictorial." We have some idea of rustic quaintness lurking in our minds when we use the word "picturesque." How shall we analyse the distinction?

Without being led to wander too far from our subject by an etymological hint, we think we may indicate one characteristic of the picturesque in architecture that will be enough for our present purposes. We should say, then, that for a building to be picturesque, the first requisite is a broken and distinctive sky-line. We must so far qualify this remark as to admit that a picturesque building may be seen which is not relieved against the sky, from the best points of view. It may, for example, be a cottage embowered in a wood. In that case, what we call sky-line does not properly exist. But there will be what corresponds to it, and takes its places,—relieved outline. If that outline be tame, regular, bi-lateral, perfect in its balance, the element of the picturesque will be, we submit, wanting. A turret here,—a gable there,—a lofty and twisted chimney,—an outline so like that of a wood or a copse that, at a distance, the observer may inquire whether the profile on the horizon is that of trees or of buildings,—that, certainly, is what we expect when we speak of the picturesque in building.

Against this marked individuality of structure (which is the most striking feature in the view of Nuremberg to which we have before referred) the street architecture of the nineteenth century makes a protest. We do not say that it is a protest that is absolute, or that will not be overruled. On the contrary, we have, even in London, buildings growing up here and there which, by their magnitude as well as by their architectural outline, will by and by impart the air of a true picturesque grandeur to their neighbourhood, if only we are able to prevent the uprising of forms so hideous in their neighbourhood as to destroy all that is either picturesque or pictorial. What would be the effect of Haddon, or Longleat, or the Papal castle at Avignon, or any other building, however romantic in its associations, on the eye, if it were neighboured by an enormous wagon-roof like that of the Charing Cross or of the Cannon-street Station? Such an ungainly neighbour would absolutely crush and obliterate the finest architectural *coup d'œil*. But apart from such monstrosities as these, or as the enormous cowl which deforms another London sky-line, the towers and pinnacles of some of our new buildings bid fair so far to dominate the lines of house and street façade as to give many picturesque effects to London architecture, especially in the neighbourhood of the Thames.

No better instance of what we mean can be cited than that which is afforded by the Houses of Parliament. We are not now about to talk again of the general elevations of this great palace, or to inquire whether, considering the style adopted, a greater diversity of elevation would not have been an improvement. We only wish to look at the fact. Take the river front. There can, we apprehend, be no question that the front would fail to impress the observer with as much sense of the real importance and dignity of the building as it now conveys, were it not dominated by the lofty and irregularly-disposed towers. If we suppose that a Victoria Tower had been erected at each end of the façade, while a certain sense of grandeur might have been produced on the mind on a very close approach,—we suppose no one can deny that the effect of the building from a distance would have been immeasurably impaired. The variation in the height, position, and proportions, of the three most lofty parts of this great palace, as defined against the sky-line, gives a charm to the whole which could not be attained, we apprehend, without this picturesque element of irregularity. Dominated by the towers, the uniformity and balance of the façade lose their otherwise artificial look. The towers raise the façade from the rank of street architecture to that of urban architecture.

If thus "the old order changeth, giving place to new," we may hope that out of the very needs and requirements of social life will arise buildings of a magnitude and beauty that will so far relieve and dominate the increasingly artificial regularity of our street fronts as to render the London of the twentieth century worthy of the noble river which was the cradle of commerce, and which thus determined the locality of the metropolis. And this is the more needful because of the special element of poverty in street architecture which is present in much of London, and also in Paris, Marseilles, Turin, Rome, or Naples. The truth is, that our ancient and sturdy boast, "Every Englishman's house is his castle," proud as it may be from a constitutional standpoint, is highly un-architectural when we come to deal with urban architecture. For the Englishmen are so many, —and many of them so poor,—that the castle shrinks to a very modest size. A six-roomed castle can hardly, by any stress of genius, be made imposing and architecturally happy. At all events, it is one of half a million of closely-packed neighbouring castles of the same kind. The Frenchman or the Italian who requires one, two, three, or more rooms, is content to take them in a large building. The Englishman, at all events, if he be married, is never happy without he has the key of the street door in his own possession. This disposition, unfortunately, is hostile to fine building. Even in the one item of ground-rent, where urban sites are continually rising in value, the small house system is a most extravagant one. The same thing may be urged as to almost every detail of building: a monastery, or a barrack or a palace, as we see these buildings abroad, may at once present true architectural dignity, and afford convenient and accessible accommodation for very poor inmates. In the magnificent view that meets the eye of the traveller from the summit of Vesuvius, as he looks northwards across the deep blue of the magic bay, to the white houses of Naples gleaming in the sun, there is a building which impresses the attention more than the Royal palace, the tower of Masaniello's church, or any of the really noble buildings within ken. It is the Albergo dei Poveri; we suppose we may call it a gigantic almshouse. It is a building erected on charitable grounds, to give shelter to the houseless poor. Yet so well proportioned is the edifice, as well as so large, that at the distance of eight or ten miles it appears to be by far the most important edifice in Naples. The only parallel to this in our country, and it is a very distant one, is to be sought in the union workhouses. The idea of combination in an abode is one so distasteful to the Englishman, as a general rule, that but small way has as yet been made in those well-intended efforts to introduce the system of flats, or other combined dwellings, to which we have on not a few occasions heretofore called the attention of our readers.

In one respect, indeed, the principle of combination of abodes has attained a remarkable development in London. In 1834, before the completion of the London and Birmingham Railway, the hotels of London had by no means assumed any special architectural character. They either resembled, and indeed were, one or two private houses run together, as in the case, if we rightly recollect, of the Clarendon, and later of the Trafalgar Hotel; or they were local inns, built for the cheap accommodation of coach passengers, as the Gloucester Coffee House, or the White Horse Cellar. City-ward there were, and in some cases there yet remain, inns of a somewhat Shakspearian stamp,—Green Dragons, and Bulls, and Griffins, and the like, in which external wooden galleries looked down on the inn yard, and gave access to the separate bed-rooms. Whether built as hostelries or not, these ancient inns were revivals of an early form of that architecture. A large gateway, took up great part of the street front; and the body of the building extended rather at right angles to, than along, the main street. The Euston Hotel, considered an enormous structure when completed, was a bold anticipation of the requirements of the passenger traffic to be developed by the Birmingham Railway; and was an instance of confident and verified foresight. Now the Euston and its twin brother are by no means conspicuous for size. Hotels are more and more swelling into palatial buildings, and that not in London alone, but at Brighton, Bournemouth, and elsewhere. The Langham, the Victoria, the Charing Cross, and the Midland hotels are among the buildings that first catch the attention in a bird's eye view of London; and each addition to the number endeavours to out-top, or to outswell, its predecessor.

That combined residences for the permanent bachelor inhabitants of London, or for the small family, will follow in the wake of the hotels, we think extremely probable. Even as it is, those central spots that have been successively cleared for purposes of improvement, as close by Holborn-viaduct and in Northumberland-avenue, are being lined by houses of what, years ago, would have been regarded as a prodigious height. How far the "mansions" which have raised legal difficulties on account of their great elevation, have answered, or are likely to be imitated, we are not now prepared to say. But it will be seen that street architecture is assuming a phase of magnitude and costliness which is transforming the face of London. Whether the assertion of individual taste (or the absence of that quality), will land us in a jumble of costly monstrosities, or whether combination, instead of competition, among proprietors and architects will give a more harmonious character to our street architecture, we may not venture to predict. The one point which strikes us as indubitable is this: Unless the grandeur of public buildings, and the features of lofty towers, spires, or pinnacles, erected, not to gratify private fancy, but in true architectural symbolism of the object of the edifices which they adorn, keep pace with the increasing hugeness of private or of business structures,—of shops, warehouses, and hotels,—whatever cost may be lavished on the street architecture of London, the element of the picturesque will be absent. Rows of large houses, when smoke and decay have been at work on them for thirty or forty years, will not be much more imposing than rows of small houses; unless the public building assumes its true position as dominant over building that is private, and unless a varied and picturesque sky-line counteracts the level sameness of interminable rows of parapets or of chimneys.

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**Brixton.**—The foundation-stone and three memorial stones of the proposed new church of St. Paul, Brixton, were laid on the 1st instant. The site of the new edifice is in Santley-street, Ferndale-road, Brixton. The building will be of brick, with Bath stone and terra-cotta dressings. It will seat 1,640 people, and will be provided with galleries on both sides. The architects are Messrs. Habershon & Fawckner, of Bloomsbury-square, and the builders are Messrs. D. C. Jones & Co., of Gloucester. Mr. J. R. Manning will act as clerk of the works.

## THE CAUSE OF THE EXPLOSION OF GAS NEAR TOTTENHAM COURT ROAD.

IT is now seventy-eight years since the Soho Factory, near Birmingham, was first lighted with coal-gas by William Murdoch, and it is sixty-seven years since Clegg, Manby, & Murdoch erected apparatus for the lighting of London by the same agency. The first public display of the new illuminating power was made on the occasion of the visit of the Emperor of Austria, the Czar, and the King of Prussia to the City, when they received the hospitality of the Lord Mayor in the Guildhall. At that time the direst predictions were made as to the danger that London would be blown up. With the exception of local cases of damage (such as that in the house of Mr. Gambart, in the Avenue-road, Regent's Park), due to neglect in shutting off the gas-cocks, no approach to the fulfilment of such menaces has occurred until, on Monday, July 5th, the series of explosions in the neighbourhood of Tottenham-court-road, described in our last number, led many persons to form the conclusion that London had been visited by an earthquake.

The reason of this long immunity from mischief is simple; and simple is the reason of the catastrophe which has just occurred. And while lamenting the loss of life, the terror, and the distress occasioned by the explosion, it is satisfactory to be able to point out the causes both of the safety which is the rule, and of the destruction which is the exception, and to show that alarm has been exaggerated, and that recurrence of such an event is rendered more unlikely than was the explosion itself, after an experience of three-quarters of a century.

We do not forget, of course, the explosion of a gas-holder, or deny the danger attendant on the use of coal-gas, except under proper supervision. But we can reassure our readers against such a thing as the sudden discovery of a new source of danger for the inhabitants of the metropolis, which has been the comfortable prediction of certain sensational announcements. Although caused by the explosion of gas, the catastrophe in Tottenham-court-road cannot be brought under the category of accidents likely to arise from the ordinary use of gas. In fact, it has a much closer analogy to those explosions of which, year after year, we have so many instances to lament in our coal-mines.

Coal-gas, our readers pretty generally are aware, as it is sent through the subterranean pipes which honeycomb the metropolis is not by itself either explosive or combustible. To burn or to detonate it requires an admixture of oxygen. This may be supplied from the atmospheric air. And so far is the carburetted hydrogen gas used for the illumination of our cities from being a dangerous explosive substance, that the slight pressure which is measured by half an inch of water is enough to maintain such a current as to allow the issuing gas to burn freely, without the least fear that the flame should make its way into the pipe that supplies the burners.

The reason of this safety lies in the fact that coal gas is only explosive when mixed with a certain proportion of oxygen. Pure hydrogen burns with a pale blue flame of intense heat, and carburetted hydrogen with a more luminous, though less hot, flame, if allowed to catch fire at the moment of its coming into contact with the atmosphere. The brilliant oxyhydrogen light is produced by the inflammation of these two gases at the moment they are brought into contact in the proportions which constitute water. The action, comparatively, is gentle. But, on the other hand, if carburetted hydrogen be mixed with a certain proportion of oxygen, or of common air, it forms a dangerous explosive. Quiet combustion is then impossible; and on the contact of flame, spark, or red-hot metal, the whole mixture instantly explodes.

This is what occurs in the workings of the collieries. From all newly-cut bituminous coal, carburetted hydrogen gas more or less rapidly issues. At times stores of this gas are tapped by the miner, and a large volume issues from the workings. One main aim of the ventilation of coal-mines is to keep up such a constant circulation of air as shall prevent the formation of an explosive mixture. And, as it is known that this precaution will at times fail, the other element of safety is the absence of any naked light with which the gas may come in contact: the use, in fact, of the safety-lamp.

What occurred on the 5th of July was this. Gas had leaked from the mains in use into a new main which was in process of fitting, and which had not yet been connected with the gas-works. It was supposed that this pipe, which is of the large diameter of 36 in., was in the same condition as the surrounding atmosphere, that is to say, that it merely contained ordinary air. By some unsuspected filtration, however, coal-gas had made its way into this pipe. Of course no current of ventilation had been provided, and the phenomena which occurred showed that the mechanical mixture which had taken place was irregular and imperfect, attaining in some places highly explosive proportions, and in the intervals only combustible proportions. It is to be borne in mind that this infiltration of gas was entirely unsuspected. The terrible warning which has occurred will teach the gasfitter hereafter to regard an empty pipe as a possible source of danger. But we are unaware of any circumstance which pointed in that direction before last week; and we apprehend that, if any engineer had been asked, "Can there be any coal-gas in the 'dead main,'" he would have replied, "Certainly not." How it got in is matter of question. But its presence is proved by the explosion. So also is the fact that explosive mixtures were only locally formed, although there was enough carburetted hydrogen in the mains to communicate flame from one to another of these local mixtures along the whole length marked by the successive explosions.

It may be regarded as most unlikely that such a catastrophe should recur. The laying of a 3-ft. main is not an ordinary occurrence. And for the future, being now aware that such a main may become a possible source of danger while being laid, the engineer will take precautions of which no one ever dreamed before the recent event.

As to the questions, "How was the light communicated?" and "How did the gas get into the main?" it is possible that we shall not be able certainly to reply. With regard to the first, nothing could be more straightforward and honourable than the evidence of the witness Hawkes. Under the circumstances we have mentioned, it is clear that no blame can be thrown on any of the officers or men employed. The peril was not, indeed,—or rather will not be in future,—as mysterious as that of earthquake, but it was quite as much unforeseen. As to the other question, the lesson is more practical. The gas companies and the water companies of London are aware of the constant loss of a proportion of their gas and of their water. The gas sent into the mains is not accounted for by the consumers by some five per cent. The loss of water is yet more considerable. If we ask how this can be, we have an immediate explanation afforded by one of the great barbarisms of our present arrangements. For a delicate system of closed pipes, conveying either water or the more subtle fluid of gas, the first element of secure maintenance is, that the joints should be undisturbed. How do we effect this? We dig a trench in the ground; lay the pipes with due care; shovel in the earth, and turn carts, vans, omnibuses, and even traction-engines and steam-rollers, over the top. We might, with as much good sense, set a gang of men to drill holes in the pipes at such intervals as pleased them. Displacement must begin as soon as a road is opened for traffic. After a time leakage results. When the leakage has become so serious as to be perceptible to the nose, or by the dampness of the street, a gang of men make their appearance. They quietly deposit logs of wood or other obstacles in the way of the traffic, pull off their coats, and commence an attack on the road with enormous pick-axes. Pitching, paving, asphalte, macadam,—whatever be the artificial surface of the roadway, yields at once to the attack. The sextons of the mains delve down as if intent on carrying out a burial ceremonial of their own in the heart of the metropolis. Then come men with devils, that is to say, iron fire-baskets, which are known by that profane title, and solder the joints of the pipes. The work is carried on with the utmost coolness, the traffic having to stop or to go round, as best it likes, mean time. A good job, no doubt, is made of it. The leaks are stopped as far as they are discovered; and as soon as they are stopped, measures are taken for re-opening them. The earth is shovelled in again, the traffic is turned on again, and the difference between the resisting-power of newly-filled earth and of that which has been consolidated by pressure is thus set in operation as a sure and rapid mode of producing more leaks. The whole process is good for trade. It employs a certain set of workmen in a work which, with proper arrangements, would be wholly unnecessary. It is thus in exact accordance with the ultra democratic theory of the true mode of conducting public work. The freedom of the subject is respected, the independence of the various companies is respected,—independence alike of one another and of the public convenience. If a street is ripped up to-day by the water companies, that is no reason why the gas companies should not have their innings. Thus every one is served in turn. The cost of water and of gas is increased by preventible leakage, by preventible work done in search of the leaks, and by cost of reparation. That principle which is held by some persons to underlie the social compact,—namely, the duty of the state to provide work for the workingman, is carried out to a great extent by the provision of a good deal of unnecessary work. That under such conditions leakage has for once occurred into, instead of merely out of, a pipe, need surprise no one. It has, however, had the effect of calling public attention to the one real cause of the calamity that has recently occurred.

There are certain subjects on which the public writer, after a time, learns to be silent. Not for the reason that he has nothing to say, but for the reason that, having something very important to say, he knows that so deaf an ear will be turned to his remonstrances that he loses heart in the matter. Such has been the case with regard to preventible explosions in collieries. We have more than once or twice pointed out the fact that, if a convenient and luminous safety lamp (of which we could with certainty suggest the principle) were put in the hands of the miners, and if the men were properly searched before being allowed to descend the shaft, explosions would cease, — that is to say, if the proper regulations as to the use of powder were also enforced. In the same way we have pointed out, over and over again, the great waste of money involved in our inexcusable mode of laying the mains of the water and gas companies through the streets. If the bill of costs were cast up, it would be a heavy one. Look at the cost of repairs and reconstruction of road, the extra wear and tear of carriages, the loss of time, the injury to horses,—of all this we have often spoken. Now we have a very serious item to add to this cost, namely, that of the leakage of the gas and water pipes, at all events to a very considerable extent. If we set down 100,000*l.* per annum as an approximate estimate of the loss by leakage, we shall probably be far within the mark. Then comes the question of the amount of damage effected by leakage; and here is a very grave and important consideration. In the present case, loss of life and great alarm are added to the foregoing results of neglect. Nor need we hesitate, however much light may be thrown on the actual facts of the present case, to attribute the leakage which had so fatal a result to the false mode of laying, and to the disturbing effect of traffic. The evidence is precise as to the good condition of the valve connecting the two mains, when examined. The state of the connexion at the time of the explosion cannot be arrived at from any other source of information than that furnished by the explosion itself. If other points at which gas may have filtered into the main existed,—which the successive occurrence of the explosions indicates as most probable,—it has yet to be pointed out where they were. But along the whole course of the main, actually or potentially, the great disturbing element of traffic over the pipes had to be contended with. The cost that would have been saved in London if the principle of a subway, for the purpose of sewerage, water-supply, and gas or electric lighting, had been in good time adopted, it is not easy to estimate.

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**Plasterers' Society.** — Our attention has been called to the alleged worth per member in this society of 51*l.* 9*s.* each, and it is asked how 1,850*l.* 3*s.* 2½*d.*, divided among 4,580 men, can amount to 51*l.* 9*s.* each. The figures given are quoted from the comparative table on page 51 of the report, in which the several sums stated are set forth. If the general funds only are given in the one case, and branch funds are included in the other, the secretary or auditors ought to have notified the fact; as they now stand in the comparative table, the total worth per member is only 2*l.* 10*s.*,—not 51*l.* 9*s.*, as there stated.

## A HISTORY OF PAINTED GLASS.

THIS * seems likely to be, and is, as far as it has proceeded, an exceedingly useful and interesting work. It is intended to be completed in four volumes, of which the first deals with the subject from the earliest known specimens to the end of the thirteenth century; the other three respectively with the fourteenth, fifteenth, and sixteenth centuries. The greater portion of the first volume is now before us; the whole is to be issued in parts, either two or three to a volume, at intervals of three months. The author has long delayed the intended production of the work on account of the frequent discovery of new facts and materials, but he has wisely determined not to postpone it longer on this account, but to make use of what he has already collected. From the business-like manner in which the work is put together, we have no doubt that the production of the successive parts will be continued in due order to the end (which, as many of us know, does not always happen with works that are promised in serial parts); indeed, we are assured in the preface that the majority of the blocks for the illustration of all four volumes are already completed.

Mr. Westlake has excellent qualifications for his task, in being both a student of ancient, and a designer of modern glass-painting, and he understands the subject both from a practical and artistic point of view. The two parts at present produced are copiously illustrated, but the author has abstained from attempting illustrations in colour, for reasons which may be said to be good and sufficient. In the first place, coloured illustrations would have "more than quadrupled the price of production," and thus put the book out of the reach of many who may now profit by it; and, secondly, he is of the opinion that it is nearly impossible to render the effect of coloured glass by painting: "the illustration thus produced is a gaudy deception, and in most of the works so published it rather misleads than assists." Even highly-elaborated drawings often fail to give any real impressions of the character of the original, partly in consequence of their very elaboration. The comparative roughness of execution which makes so much of the character of the original is lost sight of, and the whole is represented in a state of finish and delicacy which it never had in reality. Those who have compared chromo-lithographic representations of Egyptian or of Mediæval coloured ornament with the originals will know how much difference there often is between the coloured publication and the original. We see Egyptian ornament, perhaps, represented with a precision and clearness of line, a brilliancy of colour, and an entire symmetry in the drawing, which we find to be entirely wanting in the original, not only from the fading of colour which the illustrator has restored, but from the careless and irregular drawing which the illustrator has represented as a modern draughtsman would have drawn it if a sketch of the design had been handed to him to work up. In the same way the sumptuous tone of early glass is represented in the "chromo" by a flat tint which gives no idea of its real texture, and which in all probability is very often not true in tone either. The history and character of design in stained glass may be given in engravings; the colour must be studied in the originals if it is to be studied to much advantage. This is what Mr. Westlake wishes to recommend to the student, and in this respect his work is of the greatest value in giving detailed information as to where the best examples are to be found, and, in cases where the collection is extensive, giving a key-plan of the positions of the windows, with the names of the subjects, as far as they are known. Whether it is altogether true that "it is impossible to design well for stained glass, without studying the old work *in situ*," depends to some extent exactly on what is meant by designing well. If it means reproducing the character of Mediæval glass work, we agree entirely; but if it means original design and style, we are inclined to think that the tendency of constant study of old work *in situ* is apt to lead,—perhaps with most people almost inevitably leads,—to mere archæological copying, sometimes without the student having at all deliberately intended such a result. The study of any particular school of art-work in its old examples, is very apt to develope in the student an artificial standard of judgment, too favourable to the class of work which he has become familiarised with, and has learned to see more in than others less committed to its study can discern in it; and from this influence Mr. Westlake does not seem to be free. His taste seems to have become to a certain extent Mediævalised, and he speaks with great admiration of figure-designs which, if presented fresh to an artist who had not become "acclimatised," as one may say, in regard to them, would certainly not excite admiration. This, however, seems the fate of students of Mediæval art, and we cannot criticise Mr. Westlake decidedly for a weakness which he shares with so many others.

In regard to the conditions of the art of glass-painting, Mr. Westlake takes a very decided stand in favour of figure-painting as its leading object, and places very little, as it appears to us far too little, value upon ornamental mosaic design, in self-coloured pot-metal,* with which such rich and indestructible polychromatic effect can be realised. This he seems to regard as a glazier's art, and he is still more indifferent to the beautiful effect of Cistercian grisaille windows, which he merely alludes to in a paragraph in passing, and gives one small illustration of. We need hardly remind our readers that this Cistercian form of glass has been regarded by some of the best authorities on architectural effect as one of the most beautiful and suitable treatments of window-glass that has ever been invented. We are not, of course, putting it on a level, in regard to artistic importance, with highly-coloured glass introducing figure design; but it is a more important and suggestive form of glass treatment than the author seems disposed to admit. Mr. Westlake, however, draws the line distinctly between painted glass and coloured glass, his book being especially the history of *painted* glass, under which term he does not include pure pot-metal leaded into mosaic,—that he calls *coloured* glass. He says at the close of his introduction, "It is upon the use of enamel paint that the art depends; this separates it by a chasm from all the other arts in glass." Enamel process on glass is often used to indicate the later method of merely painting on the surface of the glass, without any burning, a process which all who understand the subject have condemned as deficient in transparency and certain to decay. We cannot, of course, suppose that Mr. Westlake here uses the word "enamel" in this sense; he, of course, uses it for vitrifiable colour painted on and fixed by firing; but there seems an undesirable confusion of terms among writers on the subject.

In regard to the earliest examples of glass-painting, there is a good deal in the first part of the book which is either actually new or presented in a new combination. The portions of the old window from the cathedral of Le Mans, figures apparently forming part of an Ascension picture and placed together for preservation in one of the windows of the cathedral, are given as probably the earliest extant example of painted glass, dating from the eleventh century. Other authorities have claimed higher antiquity for these; but the reasons for fixing it to the eleventh century, probably the latter part, seem nearly conclusive. Mr. Westlake gives a diagram of the probable original composition of the window, and the place which the still existing figures occupied in it. One of the most important conclusions to be drawn from the Le Mans window is in regard to the very different and, from a decorative point of view, very inferior appearance which a painted window must have presented when the window was divided only into large squares by the iron supports necessary for the glass, before its division into small medallions and before the mullion system was developed, which inevitably suggested the breaking up of the whole design of the window into small compartments.

One point which Mr. Westlake has attempted to work out with considerable success, and which is of no little interest, is the existence of a central school of stained-glass design in France, in the twelfth century, the teaching and influence of which gradually extended through France and to this country. It would require a larger number of links and examples than now exist to establish this beyond controversy; but the examples collected and compared by Mr. Westlake point very strongly in favour of his conclusion, and, at all events, illustrate the progress of the art in a very interesting manner. The head quarters of this early French school, the author supposes to have been Chartres and its neighbourhood; and the chief evidence in favour of his theory is presented by the comparison of figures and details in the Jesse window at Chartres with parts of a window of similar design at St. Denys, and with some of the remains of twelfth-century stained glass at York. The resemblances between these are, as Mr. Westlake observes, more than accidents of style; they are those of a school. "The foundation of the design of all the ornaments is clearly traceable to the Greek." This is undoubtedly the case; and we may suggest, as Mr. Westlake omits to do so directly, that this fact in itself seems conclusive as to the importation of the school into this country from France. It was only through the latter country, which had so much relation with Byzantine art and Byzantine artworkmen, that reminiscences of Greek detail could be introduced; there was no reason why anything should be known of it in this island at that period. The whole conclusion Mr. Westlake sums up at the end of his chapter ix., thus: "That the art is of French origin, and that it was cultivated first by French people, or foreigners in France, and that it was slowly but surely making its way from a centre not a hundred miles from Paris, to England and Germany, towards the close of the twelfth century. It was then still a great luxury, and I should doubt whether a dozen churches in England had any quantity of painted work before 1200. As the thirteenth century progressed scholars developed into masters, and schools multiplied, and before 1400 it became one of the most popular and common of arts. It had not been raised by this demand and supply one whit in grandeur of design or excellence of material, but a certain *finesse* of execution became developed by the great practice the executants attained, and as design lost dignity it gained facility: this is not a remark peculiar to this art or to this period."

It would have been more correct, according to the meaning which is obviously intended to be conveyed, to have inverted the latter sentence, and said that "as the art gained in facility it lost in dignity," since if there is any cause and effect in the matter it is in that direction; loss of dignity could in no way lead to facility, but the reverse may and often has been the case. But we very much question whether the conclusion as to the essential deterioration of the art is so true as Mr. Westlake would have us think. That it deteriorated in the close of the Mediæval period, at the same time that the greatest facility of execution was attained, is true enough; but the author seems to imply that this deterioration had commenced in the thirteenth century. If we understand him right, one of the instances of this lies in the fact that towards the end of the thirteenth century the figures began to assume a more naturalistic appearance; as he expresses it, they began to "pose"; in other words, a certain power of drawing the figure in varied positions was acquired, in place of the stiff monumental attitude, or rather absence of anything which can be rightly called attitude, in the work of the previous period. Now, even admitting the fact that stained glass demands a certain severity of style in figures, is it a true criticism which can regard the attainment of this power of representing the balance and pose of the figure in varied postures as a sign of decline in the art? Surely not. Then take the heads: compare the head of an angel from the north rose-window of Lincoln, given as an illustration on p. 75 of the work, with any of the heads of figures of the older period illustrated in previous pages,—the advance is great and unmistakable, unless power of drawing and expression are really to go for nothing in stained-glass design. In the older figures the heads are either shown in stiff front elevation, or when shown in half or quarter face they are wrongly set, and the features drawn with no perception of true perspective: in this Lincoln head there is real freedom and grace, and the power has been attained of showing correctly, or nearly so, the difference in contour of the two sides of the face and of the orbit of the eyes in a head half turned away; and are we to regard this as a decline in art? Such a conclusion seems to us an example of the way in which, as we have observed above, critical judgment becomes warped by the constant study of a favourite, but incomplete and archaic style of art, until its very shortcomings are regarded as beauties. It might be urged with more reason that the

* A History of Design in Painted Glass. By N. H. J. Westlake, F.S.A. Vol. I., Parts I. and II. London and Oxford: James Parker. 1879.

* Mr. Westlake appears to use the term "pot-metal" indifferently, either for glass coloured bodily in fusion, or for colour laid on the surface and then fixed with a flux.

character of ornamental accessory detail deteriorated; but we doubt if even this is fairly true: some qualities were lost, some of that solidity of character which marked what may be termed French-Byzantine detail; but our English thirteenth-century detail had other beauty of its own, in its elegance and variety, equal to that which it displaced. The grandeur of the subjects, the solemnity with which the great Christian legends were contemplated, may have declined as the church became more mingled with the comparatively modern world of action after the fateful year 1000; but it may be doubted, again, whether our idea as to the greater solemnity of feeling of the older art is not partly due to the effect inevitably conveyed by an art which cannot express passion or natural feeling, and which, therefore, appears more solemn and earnest through its very deficiencies.

This defect, as we think it, in the critical views of the author, hardly impairs the value of his work, which we recommend as, so far as the executed portion of it is any criterion, the best work on the subject which has yet appeared in this country. Mr. Westlake would do well, in a literary point of view, to cultivate a little more simplicity of style and avoid occasional lapses into "fine writing"; and we may point out that there are some errors in regard to the reference numbers to the plates, which a more careful correction of the press would have avoided. But we shall look with much interest to the continuation of the work.

## THE ARCHITECTURAL CONGRESS AT ST. GERMAIN.

EVEN regarded from a professional point of view, not the least interesting of the excursions made by the Architectural Congress, recently held at Paris, was the visit to the Gallo-Roman museum, at St. Germain-en-Laye, made additionally instructive by the help of the accomplished curator, M. Bertrand, whose enthusiasm led him, in that delightful way that enthusiasts on one subject always have at their command, to inoculate the whole party with sympathy in his collection.

It would be difficult to say what feature in the history or topography of the courtly old town of St. Germain-en-Laye has given it the worldwide reputation it enjoys,—whether the stay of Louis XIV. in its Renaissance château which Francis erected and beautified with his picturesque emblem of the salamander, whether the residence of an heir to the English throne, the unfortunate "Pretender," in the same château; whether the beautiful terrace, with its famous view, or the proximity of Marly (certainly St. Germain is familiar to many through Turner's exquisite sketch of the old town, as seen from the Seine), or whether, in more recent days, M. Thiers's residence and death there; certain it is that St. Germain, its château, and the old Pretender are known to many who have never heard of the museum that has been formed in the old home of "James III.," which, after many generations of neglect, has now been placed conscientiously into a state of thorough repair, from the designs of the late eminent architect, Eugene Millet."*

The museum has long been known to archæologists, but lately a number of valuable additions have been made, enriching a collection in which are carefully-classified, with a simplicity beyond criticism, a characteristic series of relics of the past existence of the human race, from its earliest known development down to the Christian era. It is more particularly to France that the contents of the museum are confined, but no less clearly do the collections show us the contemporary existence of Great Britain, and, in fact, the whole European continent. From the excellent system of arrangement of the various objects which compose it, the St. Germain "Gallo-Romano Museum," as it is termed, possesses in a high degree that quality which it has always been the endeavour of museum authorities to develop,—the quality of affording sound information accessible to the intelligence of all students. No object is placed in such a manner as to attract exceptional attention, liable to interfere with a general study of the whole, but every object, from the most insignificant to the most important aids in leading to the same end (the reconstruction of the existence of the innumerable generations which have succeeded each other on the soil of what is now called France, from pre-historic times down to the commencement of French history proper) is set forth.

Whirled from the St. Lazare Station at Paris, an hour's journey, passing rapidly on the way many a quiet and historical suburb, brings one, along the first railroad established in France, almost to the foot of the old château, with its piazza, and the little church in which repose the mortal remains of "James III. of England." From the bustle and roar of the "modern Babylon," fifty minutes have sufficed to land us in the age of the cave-dwellers, represented in the "salle des cavernes." Man is living in a den which he endeavours to render inaccessible to the terrible beasts that surround him. He defends himself against them with those flint instruments and arms now so familiar, and which geologists find in the quaternary alluvial deposits. No date can be fixed, it is a crisis of the world in a state of formation, a purely geological period. Art, however, has already shown itself. The hairy wild being called "man" has already been moved by a superior instinct; with the animals he daily chases vividly before his mind's eye, he tries to reproduce their image on his stone weapon and his bone implement.

The second room is the "Salle des Dolmens." We have reached the period of those mysterious works of man which in the time of Carnak,—prolonged without interruption over a length of nearly thirty miles,—have given rise to so many contradictory theories. To erect such enormous stones which are found, strange to say, throughout the whole of the west of France and in England, an organisation, relatively advanced, must have existed. The bracelets, necklaces of jade, and of turquoise found in the excavations prove this fact. These dolmens reveal a civilisation in its infancy, but the secrets of which still remain unfathomed. In spite of every research, these strange monuments rise like an enigma before every inquirer. The "Salle de Garrinis" (an island off the Brittany coast), completes the relics of this mysterious period, relics on which are to be found more than one symbol to be met with in Egyptian art, the spiral and the hatchet being particularly noticeable.

Perhaps the most plausible explanation, and one now generally admitted by the learned,* of the peculiar civilisation represented in the dolmens, is the arrival in Gaul of one of the emigrations of Joraclites who fled from the bondage of their Egyptian task-masters. These partial flights were not unfrequent before the great move organised by Moses. The fugitives, as was natural, would bring with them the recollection of the huge monuments on which they had been obliged to work. In considering these funerary dolmens and menhirs, which so resemble ill-shaped obelisks, if we do not find them ornamented, it must be borne in mind the manner in which the hugh monoliths of Egypt were covered with hieroglyphics. These monoliths were, in the first place, set up as they came from the quarry; generations of artisans then continued to shape them in their place; and finally came the artists, who, initiated into the sacred rites, engraved on them their hieroglyphics. Captives, as we know the Israelites to have been, they knew little but the mere manual portion of their work; they transported the huge stones from often distant quarries, but beyond this knowledge their position forbade them to go. But of this mystic period, which bears the vague name of "the stone age," all is as yet supposition.

The epoch of the lake-dwellers on which we enter in one of the rooms is equally in a state of dim uncertainty. Humanity is still groping onwards in an embryo state. The epoch may be co-eval with that of the dolmens; but it is characteristic of the age that these two contemporary and parallel societies should have each developed themselves almost side by side without our finding any apparent trace of the slightest mutual acquaintance. This lacustrine civilisation possesses certainly a peculiar interest; unknown to antiquity, buried—for who can tell how many thousands of years?—under the blue waters of a Swiss lake, it was alone discovered but a short time since through a phenomenal decrease of the level of the lake. But better organised than the society of the dolmen builders, the lacustrine city enjoyed many of the advantages of material comfort. The cereals were cultivated on the land near the shore; fruit-trees were planted, as we find in the vases which have fallen into the water nuts and apples half calcined. The ox and the horse were already utilised; flax was used and spun; bronze was known; and iron, though rare, was beginning to be introduced.

Like the dolmen civilisation, the lacustrine civilisation left its onward movement incomplete, and it disappears without our being able to trace its downfall. Both may be compared, indeed, to the comparative civilisation of the savages of America and the aborigines of Australia, who, for thousands of years, have never advanced, and are disappearing without ever improving,—without ever being affected by the arrival of the Europeans.

Civilisation proper only penetrates to Gaul with the great Indo-European invasion. Then appears the Celt, of whom we know, it is true, but little, but who, we can trace, brings with him traditions from his original home in India, and remembrances of the archaic art of Persia. To the dolmen, which will, however, still continue to exist in the West, succeeds the *tumulus*; and the arms, particularly the sword-hilts, found in the *tumuli*, of the purely Celtic period, before the arrival of the Gauls, recall strikingly those borne by the warriors in the bas-reliefs of Persepolis.

In company with this immigration, Druidism enters Gaul,—the Druid who again, from so many points of view, seems to have come direct from India, with his Brahmanic traditions, and who is to play so important a part in a civilisation which this time is to lead to onward progress.

After the Celts came, probably from the same regions, the Gauls or Galateans. With them we have entered the domain of history. In the rooms devoted to the Gaulish relics, there are few objects of which we do not possess some historical notice. There lie the famous swords of which Polybius has spoken, the swords which were so long and imperfectly tempered that the Gauls, in the midst of the battle, were obliged from time to time to bend them straight under their feet; in another case the short Iberian sword which Hannibal gave to his soldiers, and which the Gauls adopted. With the relics we possess, and which can be all seen here, the appearance of the Gaul can be easily restored, wearing the *sagum*, the plaid which our Scotchmen have still preserved, and which, like that garment, served the Gaul as clothing and as blanket; his face scrupulously shaved, the hanging moustache excepted, with the bronze razor which is found in every tomb. Luxury is confined alone to the warrior. The race is still half nomad, although in the tombs will be found choice vases revealing Greek and Etruscan art; but these came from the sack of Rome and Delphi. Little by little the race settles down, its social organisation powerfully aiding in the work. This organisation betrays an evidently Indian origin; it resembles the hierarchy of India, the type of all the societies of antiquity, the Brahman, the Xatria, the Soudra, the priest who prays, the soldier who fights, the masses who labour. This civilisation appears to have been singularly varied in different regions: thus in Cæsar's time, Belgium had arrived at a high degree of culture; the commonest pottery is of an elegance of form which is remarkable, and recalls the Etruscan models which the Gauls had brought home from their Southern invasion.

But it would be no easy task to speak of all the interesting features which the museum contains of the life and manners of the Gauls. Let us hurry on to the period of Cæsar's conquest. With his "Commentaries" as a guide-book, one is able to trace, almost step by step, the incidents of the struggle. Here are models of the *oppida*, or camps, specimens of the famous fortifications of Alesia, and a large plan in relief of the field of the celebrated battle. Act by act can be traced the drama in which the independence of Gaul was to succumb before the superior organisation of Rome.

What this organisation was, the rooms to be shortly opened to the public fully show. The members of the Architectural Congress were enabled, by the courtesy and under the guidance of the enthusiastic director, M. Bertrand, to visit these interesting rooms. Here we see displayed in thorough working order the literally marvellous Roman administration with which classic students are not unfamiliar, but of which so much still remains to be learnt.

No sooner were the Romans installed, than they commenced without a week's delay a

* See *Builder*, vol. xxxviii., p. 787.

* See *La Liberté*, Dec. 6, 1879.

series of works of a magnitude such as modify more deeply the social conditions and ideas of a nation than the most stringent and cruelly-executed laws. For league after league, over land uncut by any but the roughest paths, were opened huge causeways which, starting all from the Roman Forum, were to reach the smallest hamlets of still Druid-ruled Brittany. Huge mile-stones are planted at regular distances. In the humblest hamlets rise villas, baths, and circuses. The stone age seems to have been revived. The simplest document, such as we should be content to paste on the boarding of the town-hall, is indelibly engraved in stone.

A fresh revelation into the life and manners of the past is afforded in the room reserved to the symbolic mythology of Gaul. With the Roman conquest a marked transformation is noticeable in the religion of the country. The Druids, as representing the spirit of independence, are considered dangerous, and are oppressed, and to their imaginative and symbolic faith succeeds a coarse polytheism. The artists whom the Druids had forbidden to represent the Divinity develop wildly their power in innumerable idols. Every element becomes a god, the river, the mountain, the fountain Sequana (the Seine) becomes a goddess, and has her adorers. Here again a strange phenomenon is observable, the superstitions brought from India with the earliest settlers seem again to re-appear after remaining dormant for centuries. In a figure of Cernunnos with his legs crossed under him, with his hands in a hieratic attitude, on his head the horns of the Indian Bacchus, how is it possible not to see a Buddha? Are they not from the same land, the three-headed divinities which are found so constantly, and of which several specimens are to be seen in the museum? Models of purely Indian origin are exhibited by M. Bertrand for the purpose of comparison.

This strange religious disorder reigns contemporaneously with the strongly-settled organisation of the Roman conqueror. In another room we see this system at work; the whole details of the Roman military life of the period are, in fact, plainly shown. The soldier is not a poor slave; in addition to the land allotted to him he receives a good pay. Of whatever origin, whether Thracian, Spaniard, Hungarian, or even Gaul, the camp becomes his country: he knows alone his centurion; his duty is to defend the frontier against the enemy over whom his superior organisation will insure him, for many centuries, an easy superiority; within the frontiers he maintains throughout the empire an order which is rarely ever disturbed. There exists no reason for revolt. The directing classes are enfeebled by their debauchery; the smaller people are relatively happy. The tradespeople are left in peace, and are proud of their profession. The relics gathered in one of the rooms curiously prove this: *Negociator lardarius*, pork-butcher; *negociator vinarius*, wine-seller; the tinker, the tailor, the clog-maker,—all are represented on their tombs, holding each in his hands the instruments of his profession. Among these tombs, it will be understood that no small interest was aroused among the members of the Congress by the tomb of an architect, but who, by the trowel, the square, and the compasses surrounding him, it was generally agreed, among the less archæologically-disposed, must have been rather a builder than an architect.

The last room serves as a species of epitome of the long history which we have passed successively through. This room is almost entirely occupied by a series of casts from the triumphal arch erected at Orange after the defeat of Sacrovir; in the bas-reliefs of this monument will be seen all the types, all the classes, all the costumes of imperial Gaul.

It will be seen that we have commenced with the Gaul of the cave-dwellers; we leave it at the moment that the missionaries spread through the land the "good tidings of the Gospel," relating in these distant lands the prodigious events which had taken place in Galilee, at the moment when, on the banks of the Rhine, the barbarians are preparing to pour down on the civilisation of Rome, so brilliant, so refined, and so corrupted.

It is the peculiarity of this museum, and for this we must again thank the unaffected director, M. Bertrand, that the visitor is able, almost without the slightest fatigue, to embrace at a glance a comparatively immense portion of the history of our political, our social, and our artistic development. We are far from the æons of centuries of which our scientific professors speak; but, to the artistic world, this smaller range of many thousands of years is somewhat more simple to grasp, and more interesting to study.

## EXPERIMENTS IN SHIP-BUILDING.

### THE LINES AND THE SPEED OF THE "LIVADIA."

ALL persons interested in naval architecture will watch, with some curiosity, for the details of the actual performances of the *Livadia*, the anomalous raft-palace recently built for the Czar, in the Fairfield Yard at Govan, on the Clyde, and launched on the 7th of July. The *Livadia* is the latest modification of the famous circular, or rather soup plate shaped, craft invented by the Russian Admiral Popoff. It consists, in fact, of a sort of raft, in the form of a turtle, or, as the designer, Captain Goulaeff, prefers to call it, a turbot, with a palace on its back. The daily papers have given such full details of this yacht,—the *Times* having even produced a kind of diagram representing it,—that it is unnecessary to reproduce them here. But it is desirable to call attention to those main principles of structure as to which the Russian naval architect entirely ignores all rules consistent with the best results of experiments like those made for our Admiralty by Mr. Froude, to say nothing of the long labours of Mr. Reed and Mr. Scott Russell. The "wave-line theory" is altogether ignored by the builders of the *Livadia*. The possibility of floating over waters liable to stormy disturbances, without offending a squeamish stomach, has been the great point at which Captain Goulaeff aimed. The experience of the *Great Britain*, the *Great Western*, and the *Great Eastern*, has shown that great steadiness, as regards the pitching motion of a ship, may be attained by making the keel long enough to ride on the crests of two or three waves at a time. It may be taken as a corollary of this proposition, that if the bottom of a craft be made wide enough, immunity from rolling may be attained in the same way. The only drawback to this theory is, that the proportions which tend to give a lateral stability are incompatible with speed; at all events, without the incurring of an enormous expense. It will be seen at a glance that the Russian naval architect is not ignorant of this fact. The length of the *Livadia* is 230 ft., while what may, in courtesy, be called its beam, is 153 ft. The displacement is calculated at 4,000 tons, spread over an oval area of 14,500 square feet. The proportions of the length and beam of modern ocean steamers range from 6·38 to 1, to 10·61 to 1; and the resistance to the passage of a ship through the sea is taken, by the usual rule adopted by the French naval architects, as proportionate to the area of the midship section, multiplied by the cube of the velocity. The English rough rule gives two-thirds of the displacement, multiplied by the cube of the velocity. The velocity which the *Livadia* is expected to attain is stated at fourteen knots an hour. That of our recent war-ships is eighteen knots an hour; and the speed attained by an Indian despatch-boat for the Orissa canals, built by Thornycroft, of London, has been minuted at 24·61 miles per hour. As resistance is now regarded, we have the practical rule, that the indicated horse-power employed in a steamer is proportionate to the cube of her speed. The cube of 18 is more than double the cube of 14 (being respectively 5,832 and 2,744); so that the resistance overcome by the *Livadia*, in proportion to its midship section, is less than half that overcome by such an English man-of-war as the *Iris*, as far as is due to the speed maintained. But the horse-power provided per ton is more than three-fold in the case of the *Livadia*. The indicated horse-power proper to give the speed of fourteen knots an hour to a vessel of this length and beam, taking the draught of water as 6 ft., according to the practical formula given by Mr. William Allan, in his "Shipowner's and Engineer's Guide," is under 8,000 h.-p. That provided by Captain Goulaieff is 10,500 h.-p. The first is 2 h.-p. per ton of displacement. The second is 2·625 h.-p. per ton of displacement. The proportion in the English war-ships may be taken at seven-eighths of a horse-power per ton of displacement. Thus for a speed which gives less than half the resistance overcome by such vessels as the *Iris*, more than three times the indicated horse-power per ton is provided. In other words, the cost of fuel for the steam propulsion of the *Livadia* will be more than six times as much as that required for a vessel of normal proportions.

The calculations given of the displacement of the *Livadia* do not come out quite exact. If a weight of 4,000 tons is distributed over an area of 14,500 feet, there will be 3·625 square feet of surface per ton; and taking the weight of water at 62 lb. per cubic foot, we require 10 ft., instead of 5 ft., of immersion to balance the weight of the vessel. But the screws are said to draw 16 ft. of water, or 10 ft. more than the intended draught of the vessel. There is good reason to suppose that such a disposition will naturally diminish the speed of the craft, as in the case of towing a rope through the water.

Nor is this the only point to be regretted as to the arrangements for propulsion. The battle between flotation and engine-power is one as to which, by the use of steel, and the constant improvements in engines, the advantage is tending to the side of the latter. In an enormous flat-bottomed craft, if in anything, it might be hoped that so much power might be placed as to produce the known, but not thoroughly understood phenomenon, of the rise of the vessel, and its skating or sliding over the surface of the water—as a canal-boat will do if tugged at a great speed. We can conceive such a result to have been possible in the case of the *Livadia*, if the efforts of the engineer had been directed to produce it. We should anticipate that the deep submersion of the screws will be fatal to such a hope. Any way, we shall look with interest to the test of actual navigation, and shall be very glad to hear of any results of use to the shipbuilder from the construction of this abnormal floating palace.

## THE SURVEY OF PALESTINE.

SCARCELY a month passes without the announcement of some startling addition to the range of our historic knowledge, including that of the history of art. It is not very many weeks since one of those magic interpreters who have been formed and nurtured in the British Museum translated to the members of the Biblical Archæological Society a contemporary record of no less obscure and important an event than the capture of Babylon by Cyrus. The whole sequence of Medic history, according to the length of reign preserved by Herodotus, has now been absolutely fixed in astronomical time by one line of one precious cylinder. More recently still, a like cylinder has been read, which is of the time of Antiochus the Great. No very valuable information was inscribed But the mere fact of the discovery proves that the Assyrian mode of inscribing records on cylinders of baked clay was continued under the reigns of the Greek kings of Asia. And this renders it more than probable that we shall yet discover contemporary records of the campaigns of Alexander the Great.

The backbone, however, of all recent explorations in the East, is the great one-inch survey of Palestine. It is now some time since 250 persons came forward to subscribe thirteen guineas each, in order to ensure the engraving of this map, and the publication of an exhaustive memoir, enriched with plans of all the ancient ruins and places of importance, of which the sites were to be indicated on the survey. It should be borne in mind that the map itself is not a mere chart,—valuable as such a chart, if accurate, would be. There are few parts of the world in which the time which it takes to go from one spot to another depends so little on the visible distance as in Syria. Profound ravines cleave the country, descending sometimes almost perpendicularly for a height of 1,500 ft. and upwards. Thus two neighbouring knolls, from the summit of one of which the voice is audible on the other, may be severed by a valley which it will take two or three hours to pass. Such was the spot occupied by the garrison of the Philistines, marked by the two opposite rocks of Bozez and Seneh, from which issued the mocking invitation to the royal youth, "Come up to us, and we will show you a thing!" As to this spot, the survey shows the broad chasm which divides the three rounded knolls, rising above a perpendicular crag, still called "the fort" by the peasantry, from a crag of equal height and apparent inaccessibility, on the south. The geological notes will afford an explanation of the word "Bozez," or shining, as characteristic of the gleaming white of the

chalky face of the northern cliff, reflecting the rays of the sun, to which the cool shadow of the southern cliff, dotted with Seneh, or acacia, affords a surprising contrast. Hardly a goat would be thought likely to make the ascent. But in the winter of 1871 the survey party, with horses and mules, actually made their way down the face of Seneh.

The map consists of twenty-six sheets, each comprising an area of 22 minutes of longitude by 15 minutes of latitude. The survey was commenced in 1871, and completed in October, 1877, the cost having been about 15,000*l*. About 6,000 Arabic names are on the map, the outline and lettering of which are in black, and the hill shading, which forms so important a feature of the survey, being printed in sepia. In itself a representation of the physical aspect of the country, the map further serves as a key and index to the memoirs, in which all the detailed information collected by the expedition will be found.

For that information as to the plans of ancient tombs, temples, fortresses, cities, forts, and other structures which will be most eagerly sought by our readers, they will thus have to wait for the publication of the memoir. Certain points connected with one or two sites which are revered alike by the Jew and the Moslem (as, for example, the areas within the Sanctuary walls at Jerusalem and at Hebron), yet await opportunity for determination. But with these few, though important, exceptions, we believe that the memoir will afford all the information that the architect can seek as to the plans of the ancient buildings, so far as is now attainable. To these will be added scientific notes of the trigonometric work of the survey; lists of the Arabic names, as well as of the Bible names, and the ordinary nomenclature; and the outlines of the geology of Palestine. The first instalment of this store of information is the map itself. This has just been delivered to the 250 subscribers, and we believe that before long it will be obtainable by the public. As to that fact, the Palestine Exploration Fund will, no doubt, give due notice, as well as with regard to the completion of the successive volumes of the memoir.

The map of Palestine is not altogether solitary among the surveys which have been executed of those countries which now so powerfully attract the attention of the explorer. As an example of the application of the latest method of geodesic delineation, however, it is unique. And to all future time it will possess a permanent value as a faithful record of the aspect of the country at the date of its execution. The two maps which may be considered as to some extent affording similar information as to the topography of the East are, the large map of Egypt, by M. Linant de Bellefonds and the survey of the course of the rivers Euphrates and Tigris, with the Cilician Taurus, and part of Northern Syria, by Lieut.-Col. Estcourt, Lieut. Murphy, R.E., Colonel Chesney, and the officers of the expedition of 1832. This series of maps, stretching from the Mediterranean at the mouth of the Orontes to the westernmost bend of the Euphrates, at Kalah (37° 18′ N. and 37° 50′ E.), and thence to the Persian Gulf, is on the scale of ¼ in. to the mile, or one-fourth of that of the Survey of Palestine. It is little more than a chart of the rivers, with a reconnaissance of the adjoining country; and can only be taken as a preliminary datum for an accurate map of the whole district. The map of Egypt is less careful in its technical execution than are the charts of Colonel Chesney. It has the great disadvantage of making no distinction between known topographical identifications, and the theoretic identifications of the author. And as the northern limit of the delta has advanced four miles seaward between the date of the survey under the French, and that made under the orders of the English Admiralty by Captain Mansell, in 1857, it is evident that much of Lower Egypt must now be very incorrectly represented. On neither of these maps is there any attempt to give a true physical indication of the orography of the country; and geological details, which are of primary importance when any question of antiquity of site has to be discussed, are entirely wanting. The extension of a trigonometric survey from Port Said to the southern boundary of Egypt, and from the bay of Iskanderoon to the Persian Gulf, is one of the first requisites for the full knowledge and adequate development of the valleys of the Nile and of the Euphrates, those ancient cradles of the human race.

There is a signal difference, in one respect, between the value and importance of a map of Palestine and the interest excited by a map of any other portion of the world. This depends, in part, on the long range of time covered by the history of the Holy Land. In other parts of the East our glances are directed to a yet more remote past. But with the historic past the interest of the scene is exhausted. The present aspect being one either of entire desolation, or of a squalor worse than desolation itself. In other countries, where the present is active, or where the future excites the imagination, the past is brief or unknown. But we can trace back the history of Palestine for above 4,000 years. The history of Jerusalem has successive epochs of interest. We can trace the fortunes of the Holy City under seven distinct dynasties of rulers. We have some record of the rule of the early Jebusite kings; of the 466 years of the reign of the kings of the tribes of Benjamin and of Judah; of the supremacy of the kings of Babylon, of Persia, and of Macedon; of the struggles for independence against the Greek kings of Asia and the Greek kings of Egypt; of the priestly Asamonean line; of the magnificent builders of the Idumean dynasty; of the fierce struggle with Imperial Rome; of the Persian, the Saracen, the Turkish, and the Egyptian conquests; of the century and a half that glitter with the arms of the Crusaders; and of those incidents of later history which, ever and anon, have started into unexpected life, testifying to the undying interest taken by the people of Christendom in the cradle of the Christian faith. Nor has the interest at the present moment become dimmed. There are not a few among us who look forward with a conviction, which in some minds attains the force of certitude, to a proximate return of the Jews, as a nation, to Palestine. And even those who stoutly disbelieve in the probability of such an event, point to the great hospices planted by Russia, as so many fortresses, in the Holy Land. They regard the occupation of Palestine as one of the main elements of the tremendous Eastern question. And they look to the great probability of a final conflict between Western civilisation and Eastern or Northern barbarism, as impending on the natural battle-ground of Megiddo,— the Armageddon of the Hebrew prophets, and the key of the Suez Canal, according to the modern strategist. The historian, the politician, the poet, the devotee, each has a special interest in the Holy Land. Each of the great Powers whose successive action has made the world what it is, has left its name deeply scored on the map of Palestine. The feudal system, in the Holy Land only the dream of a century, built here its keeps and castles; and the pennons of the oldest *noblesse* of Europe fluttered in the defiles of Judea. The once awful dignity of the Papacy sent pilgrims, and bishops, and soldiers, to Jerusalem. On this spot imperial Rome terribly proved her relentless force. The lines of circumvallation round Masada yet exist, as if they had been left in a recent campaign. The conquering path of Alexander, who passed over the East like a whirlwind, was checked before Tyre; and the great victor reverenced the High Priest, whom he had seen in a prophetic dream. For a thousand years the smoke of the morning and evening sacrifice ascended from the temple hill. The great legislator of the monotheistic faith was borne, in this region of earth, to a sepulchre unknown to man. The cradle of Christianity lay in a country which Christendom has been unable to call its own for more than a single century.

By the completion of the map and the accompanying memoir, the position of the Palestine Exploration Fund towards the public will be wholly changed. Instead of coming forward as a body appealing for subscriptions and furnishing, in their quarterly reports, somewhat meagre results of the application of the funds, varied as they have been from time to time, they will hold the status of an association which has succeeded in endowing the scientific world with one of the most successful outcomes of the patient toil of the explorer. It is one thing, moreover, to explore, and another to survey. Any one can do the first,—after a fashion. Few people can do the second,—in any fashion. And of those few, perhaps the officers of our Royal Engineers comprise the greater number,—so far as those who speak our own language is concerned. The Ordnance Survey of England, yet unfinished, and that of India, with its magnificent lines of triangulation, are large operations compared to the construction of the map of Palestine. But they are neither more scientific nor more accurate, within the required limits; neither more original nor more exhaustive. The latest improvements in the technical work of the surveyor and the map-maker have been introduced in the survey of the Holy Land. The officers who executed it braved danger, ill-health, and hostile attack. Literally, they shed their blood in the service; and that with as much devotion as did the crusading knights. All the party suffered seriously in health. One member of the exploration actually sank beneath the toil and the climate. Judged by this kind of cost,—a cost that no money can repay,—the survey is a costly affair. Judged by the outlay of money, on the one hand, and by the graphical and literary results on the other, it must be considered wonderfully cheap. In the actual state of the East, the map has a daily increasing value. Were it not actually in the hands of the subscribers, very conclusive reasons might be urged against its publication at the present moment. As, however, it is now so far before the world, the best thing to do is to let all those who are interested in the East know of what a valuable document they may become possessed. One of the most venerable of English scholars connected with Bible study, recently said that "he blessed God that he had lived to see the completion of this map." It is a work done once for all,—well done, and worthily done; and we trust that all concerned in its production will receive their due share of the recompense for faithful and long-sustained labours. We need name no names. Honour is rendered to whom it is due in the title and signature of the map, and in the details of the memoir; and we think it will be felt that Christendom owes a debt of gratitude to all the faithful labourers who have combined to produce this important monument.

## FROM THE BANKS OF THE SEINE.

By the time these lines appear, the great national fête of the Fourteenth of July, as it is called, will have become a matter of history. It is not alone the whole of Paris, with the exception, of course, of "the Faubourg Saint Germain," that has made extraordinary efforts for the occasion, but the whole of France has taken part in the rejoicings, the peculiar feature of which has been their spontaneous unanimity. Perhaps, were it not that architecture plays a certain part in the show, it might be out of place to mention in these columns what is more suited to the pages of other journals, but the architects have been called largely into requisition; triumphal arches and various other architectural motives have been rising in different parts of Paris, while a full-sized model of the monumental statue to be eventually erected on the Place de la République, the former Place du Château d'Eau, has been in preparation for some time past. But it is in unlimited lanterns and endless yards of bunting that the popular joy has found expression. We, in England, have no idea of preparing weeks ahead for such an occasion, but here for a month and more past every little mercer's shop has been displaying its stock of tricolour bunting. This extraordinary impetus given to the bunting-trade by the rejoicings in honour of the great Flag Fête of the Fourteenth, recalls to our mind very appositely a certainly little-known story narrated to us many years since by an interesting old lady, well known to English residents on the banks of the Arno. A friend of Sir Walter Scott, she was once on a visit to Abbotsford on the birthday of the illustrious author, who had for the occasion displayed on his lawn a large number of flags. How he had obtained these Sir Walter told his guests. A shipowner having asked the author of "Waverley" to become sponsor to a ship recently built, Scott not only acquiesced, but presented the captain with a full set of ship's colours. It happened that the vessel, being one day in a famous foreign port on Sir Walter's birthday, the captain determined to mark the day; every colour was run up, and would have probably fluttered till sun-down, had not the vessel been suddenly boarded, and in the name of the admiral whose ship was in the port, the captain was summoned to forfeit the whole set of flags. Marine etiquette, composed no less of a series of touchy formulæ than that on land, forbids a merchant vessel, while the admiral's ship is in port, flying her colours. The colours forfeited were duly sent to the

Admiralty, the First Lord of which time-honoured institution happening to be a friend of Scott, told him of the little adventure, begging him in addition to accept the forfeited flags as a remembrance of the amusing incident.

Of the many thousands of English readers who will read, or have read, this week the account of the anniversary of the taking of the Bastille, which the fête of the Fourteenth commemorates, there can be but few still living who can say that their father was present on that memorable July day of the year 1789. Among the many curious letters written from France in the last century by Dr. Rigby, and recently published by his accomplished daughter, Lady Eastlake, one, perhaps the most interesting of the whole collection, vividly describes the scene in Paris on the day of the taking of the Bastille. How much are we indebted to those who preserve with affection the memorials of their relatives, and who have the ability and the generosity to give to the world the benefit of their care? We can imagine with what peculiar interest the accomplished authoress would recall within the last few days events of such a momentous character described in the beloved lines of her father.

One of the features of the past few days has been the opening at the Cercle de la Librairie in the Boulevard Saint Germain, of an interesting exhibition of old and modern books. After having been adjourned several times, the cards were at length distributed a few days since. It will be remembered how, when the Publishers and Printers' Club-house was thrown open, some account was given in these pages of M. Garnier's design, and a view given of its exterior.* The exhibition has enabled those familiar with the club from the boulevard to see the finished effect of the interior. Our respect for M. Garnier's reputation can scarcely be said to have been increased by his design of the Publishers and Printers' Club-house, which we should have imagined would have been an inspiring subject for an artist such as M. Garnier undoubtedly is; but the building of a colossal Opera-house, which in the past would have more than amply occupied the lifetime of an architect, cannot be expected, we suppose, to be good training for the refined work necessary for a not very large club-house. The exhibition has been installed in the two large rooms and the rotunda of the first floor. The exhibition is divided into two sections,—that of the old books and that of the new. In the glass cases which protect the treasures of the printer's art of the fifteenth century, M. Firmin-Didot, M. Claudin, M. Reiber, and many other well-known collectors, have placed some of their choicest treasures. The works are all French, and in most cases are specimens of the first works printed in France. Paris is represented by more than one work from the presses of the German workmen invited by wily Louis XI. to Paris, and installed by him in the classic Sorbonne and the narrow, steep Rue Saint-Jacques, Ulrich Gering, Michel Friburger, and Martin Krantz. Lyons, the second great centre of the printed book trade of the Renaissance, is represented by the works of Pierre de Sainte Lucie, and more than one other contemporary: books printed with a care and a beauty that are the despair of modern printers; illustrated with wood-cuts of extraordinary grace and historic interest. But not alone are Lyons and Paris represented among the several hundred rare volumes exhibited in the cases; here are works which issued from the modest "*librayries*" of many a smaller town then active, and which now knows little of such zeal. Caen, Angoulême, Rennes, Limoges, Abbéville, Troyes, Perpignan, Dijon, and Dôle; and even from smaller towns, such as Salins, Treguier, Haguenau and Chablis, Loubeac and Cluny. The collection, in fact, represents a history of the introduction of printing into France. Among the modern exhibits several cases of superbly-bound volumes are shown by the well-known firms; books, marvels of luxurious expense and reckless splendour, but never more than imitations, alas! sadly wanting in the noble character of the original models. In the third room a collection has been made of all the principal works issued by the publishers of Paris within the last two years. Each publisher has his case; and, what is a pleasing innovation, the books may be freely handled and inspected. The show of books, the artistic works especially, is creditable in the extreme, and is certainly calculated to make the English visitor somewhat modest in referring to the works published in the same time by our London firms. There only remains to describe the catalogue, the printing of each sheet of which has been entrusted to one of the renowned printers of Paris and the provinces. Entire freedom has been allowed to each to carry out his fancy. The competitive desire to excel has produced a curious volume, which, though to the professional visitor it may be interesting, as showing the skill of the printers, cannot be said to be so to the outsider. The binding of the catalogue has also been confided to various firms. This exhibition is the first of a series, we learn, of biennial exhibitions, all to be connected with printing and books. For 1882 there is a proposal to have a show of book-illustrations, again divided into sections, one retrospective, the other modern. This, we may feel sure, will reveal some extraordinary treasures.

Of exhibitions, we have not yet seen the last, but they are gaining a fresh instructive value, in each assuming some special subject of interest, the leading idea which regulated the annual exhibitions held at South Kensington, and which unfortunately collapsed. On the 31st inst. opens at the Palais de l'Industrie, under the direction of the Union Centrale, an exhibition devoted this year specially to the art and industry of the metal-worker. It has become now evident to every thoughtful observer that the universal exhibitions held from time to time have not entirely carried out their object, a fact to be attributed to their too general nature. The managers of the Union Centrale have, with this warning before them, advised a rigorous and analytical arrangement of their exhibitions, as being more directly instructive (their object in the advance of the industrial arts), without ceasing to satisfy the curiosity of the public. This year's exhibition commences a series of three biennial and special exhibitions, "the divisions of which are based on the natural products themselves of which the artist makes use, and which he transforms according to his skill and taste," and, continues the recently-printed report of the Union Centrale, "as we live at an epoch of experimental method and of analytic science, we wish that these exhibitions should possess a *technological* and didactic character; that is, they will each present in well-arranged order, the raw material, the tools and processes, the artists' models, and finally the works of art themselves." This excellent system is to be pursued in each of the exhibitions to be held, the first this year devoted, as we have already stated, to metal; that of 1882 devoted to tissues, paper, skins, and wood (in its application to furniture); that of 1884 devoted to wood (as applied to building and decorative purposes), stone, glass, and earthenware. When this series is completed, the Union Centrale will certainly have done much to carry out their intention "to classify the trades, follow their history, mark their progress, and analyse their elements."

Writing from the banks of the Seine, the announcement that a new Thames steamboat company is about to be formed is of sufficient interest to attract attention. As, probably, the "plant" of the company is not yet purchased, let us venture to suggest the use of screw-steamers in lieu of the paddle-wheelers in use on the Thames. Apart from the fact that the space occupied by the screw-steamer is considerably less (the whole paddle-boxes being lost space), the advance against stream is much more rapid, the management is less difficult, and accidents are less frequent; but, above all, and this is the chief point we urge, the muddy river will not be churned up each time a steamer passes. The rapidity with which the *bateaux-mouches*, or fly-boats, as they are termed here, speed up and down stream from one end of the city to the other on week-days, for the modest sum of two sous (one penny), makes them essentially floating omnibuses, — conveniences for all. Let us hope that the new Thames steamboat company will take a lesson from the Seine company, which carries its millions of passengers yearly.

**Technical Education for Plumbers.**—We are informed that the Plumbers' Company are prepared to grant their freedom to workmen, so as to make the company really representative of the trade whose name it bears. With this view forms have been prepared, which can be obtained by those concerned on application to the clerk, Mr. J. B. Towse, 6, Laurence Pountney-lane.

* See *Builder*, vol. xxxviii., p. 90.

## "THE CONSTRUCTION OF GASWORKS."

THE little book under this title, originally written by the late Mr. Samuel Hughes, has been re-written and much enlarged by Mr. William Richards, C.E.* The various improvements that have been introduced since the first appearance of the book are treated of, and the successful application of gas for heating and cooking purposes, as well as for producing motive power. The book will be found most useful by all interested in the subject. In connexion with other information concerning gas and gas-works given in our present issue, we quote from the book in question part of a chapter on the construction of the necessary buildings:—

An ordinary gas-works comprises the retort-house, coal-store, purifying-house, engine and exhauster, station-meter and governor houses, valve and regulator room, workshops, dwellings, and offices, with the ordinary appliances for testing the quality of the gas, the yard and chimney, together with the necessary plant for the manufacture of the sulphate of ammonia.

*The Retort-house and Buildings.*—The retort-house, as its name implies, contains the ovens, or, as more generally termed, "settings" or "benches" of retorts, in which the operation of distillation, or carbonisation of coal, is conducted. With very few exceptions, this is a rectangular building, covered usually with iron principals, and slates or tiles, and sometimes, although rarely, with sheet-iron. The retort-houses of large works some years ago were limited to 50 ft. or 52 ft. in width, but they are now generally built 75 ft. wide, whilst the largest retort-houses of the Beckton works are 100 ft. in width and 480 ft. long. As this work, however, is intended for those interested in small establishments, our attention will be more particularly directed to them. For the very smallest of gas-works, having only one retort, no rule concerning the dimensions of the retort-house can be given, beyond the simple observation that, for the proper working of the rake, a clear space equal to at least one-half more than the length of the retort should be allowed. In small works the retort-house is usually about 26 ft. wide, which, allowing 12 ft. for the width of the retort-stack with the space that is usually left between it and the wall, together with the mouthpieces, leaves 14 ft. clear for working. There should always be an intervening space between the ends of the stack and the walls of the retort-house; as in the absence of this, when the stack abuts against the wall, the latter is bulged out by the expansion of the brickwork on its becoming heated. In retort-houses of this width, of course only single settings of retorts can be employed; but when the number of the benches or ovens permit of it, then double benches, where the retorts are set back to back, with a firing-floor on each side of the retort-house, are usually constructed. The flooring of the retort-house should always be kept in good repair; the slovenly method of leaving it in recesses and ruts, as sometimes observed, is reprehensible, as by these ruts the coke is jerked out of the barrow, and, as the flooring cannot be properly swept after each charge, it is attended with loss; besides, in a gas-works, like every other establishment, considerable order is essential to success. The roofs of some retort-houses are formed, as observed, with iron principals and sheets, which may be desirable where rigid economy is necessary; but generally the economy is very misleading, as when iron sheets are exposed to the action of the steam arising from the process of quenching the coke, and the vapours of the retort-house, their durability when of ordinary thickness seldom exceeds seven years. With galvanised iron the duration is somewhat increased; and unless Professor Barff's or Mr. George Bower's system of preserving iron may be found suitable for this part of a gas-works, we would certainly recommend the use of slates for the purpose; by which, however, in consequence of the principals and laths being required of greater strength than when iron sheets are used, the cost is materially increased. For ordinary small buildings the front and back walls of the retort-house need not exceed 9 in. thick; usually the sides are made 14 in.; and in constructing, an essential point is to avoid a draught passing through the building. In larger works these dimensions are

* The Construction of Gasworks, and the Manufacture and Distribution of Coal Gas. Sixth edition. London; Crosby Lockwood & Co. 1880.

augmented according to the magnitude of the building. A few of the largest establishments have the retort-house very differently arranged to those of the great majority. In the centre, and extending from end to end, are a series of arches built on suitable piers. On these are constructed the ovens or benches, the piers of which correspond with those below. On a level with the furnaces of the retorts there is a stage or firing floor, where the stokers work when charging or drawing the retorts. This is about 6 ft. 6 in. from the ground, and is commonly formed by cast-iron columns and plates, extending on each side throughout the length of the retort-house, leaving an opening of about 2 ft. wide immediately in front of the furnaces, through which the coke drops when drawn from the retort into the space below, which is called the coke-hole, or coke-vault. The coke-vault possesses some advantages, for where it exists the stokers are not exposed to the continuous heat of the coke when drawn from the retorts, which falls immediately into the vault, where it is quenched by other men. Moreover, the furnaces are also clinkered from below, which saves some trouble; and the convenience of loading the coke direct into the carts from the coke-vault is also a recommendation. The objections to the coke-vault are the expense in construction; the coke in falling breaks, and is further injured on account of the very limited space for spreading, extinguishing, and storage. There are few works, and these only of the largest magnitude, which have coke-vaults attached to the retort-house. In large works of the present day the retort-house is employed as a coal-store, for which purpose their width is very considerable. Generally the ovens employed in large as well as medium sized works are built on suitable foundations, ensuring solidity to the structure, and preventing as much as possible radiation of heat from beneath. In the event of the foundations being in gravelly soil, an increased thickness will be desirable to prevent loss of caloric at that point. The coke when drawn from the retorts falls into iron barrows, and is wheeled away to a separate place for the purpose of quenching. In retort-houses of this description, the tops of the ash or evaporating pans are a few inches below the level of the ground, which is usually paved with fire-bricks on edge. Sometimes cast-iron plates have been tried as a substitute for brick paving, but the metal conducts the heat to the feet of the men with such facility as to render it objectionable. The benches of the retorts are either placed side by side the whole length of the retort-house, and having one charging floor; or, as in medium-sized works, where retort settings are placed back to back. In this case a building containing, say sixty single benches, thirty of them have their open ends or mouthpieces on one side of the retort-house, the other thirty mouthpieces being on the other side, and a 9-in. or 14-in. wall separates the benches. These are called single settings. This method was superseded some years ago by dispensing with the partition-wall, and thus the two single beds form one continuous oven, each retort being about 18 ft. or 20 ft. long, open throughout, and having a mouthpiece at each end, which are called double beds, or through-retorts. The economy derived from this plan is very considerable; but they can only be employed in large establishments, where there are at least six stokers, to charge both ends simultaneously. At a works we recently saw through-retorts changed to single. In deciding on the dimensions of the retort-house every consideration must be made, not only of the present requirements of the locality to be supplied, but also that of the future; for gas, even at the present day, is very far from being fully appreciated, and it is impossible to anticipate the various future uses to which it may be applied; but the experience of the past demonstrates the necessity of making every reasonable provision for extension. It is also important to have a good margin, and not to estimate the power of carbonisation too highly; for by unforeseen circumstances the supply of the ordinary coal may be temporarily discontinued, when recourse must be had to that of inferior quality, which yields less gas, and in consequence requires more retorts. No definite rule can be laid down for the dimensions of the retort-house; this must entirely depend on the mode of setting. With one kind of setting having a given number of retorts of given dimensions, considerably more coal is carbonised than with another; it also depends whether they are single or double, the kind of coal employed, and other circumstances. There is nothing peculiar in the construction of the walls of the retort-house more than any other buildings of the same height. Of course precautions should be taken to secure a good foundation, to extend the base by footings, and, where necessary, to use piling or concrete according to the nature of the foundation. On these points no general directions can be given, as the treatment must vary with the special circumstances of the case; the general rule, however, applicable to ordinary foundations will apply here. The cost of erecting retort-houses will, of course, vary with the price of labour and building materials in the district. The magnitude of gas-works and plant is generally estimated by their annual production; thus, a works of "twenty millions" signifies a production of that number of feet of gas per annum, and in the height of summer will produce about 30,000 ft., and in the very depth of winter about 90,000 ft. daily. In a works of sixty millions per annum the minimum production will be 90,000 ft. and the maximum 270,000 ft. per diem. In modern large works retort-houses are built in blocks, having free communication with each other, and provided with a ventilating shaft constructed of wrought iron, having a valve or door by which the heated atmosphere of the building is considerably moderated, contributing much to the comfort of the men. And, to the credit of many engineers, it must be said that the comforts of the men employed in their respective companies have had their greatest consideration. In some gas-works libraries are established, in others baths and mutual benefit societies; and there are gas-works that can boast of having a musical band, composed of the stokers and men of the establishment,—circumstances alike praiseworthy to the employers and employed.

*The Coal-Store.*—This is generally attached to the retort-house, with every facility of communication for the purpose of transporting the coals. The dimensions of this building must depend on circumstances. If the railway is the means of transport, then small stores may be sufficient; but should the ordinary means of obtaining the supply of coal be by sea, river, or canal, then in order to provide against the probability of frost, or loss or delay of vessel, the store should be ample for a proper supply, and whenever there are increased difficulties in obtaining the coal the store should be augmented in proportion. It is sometimes advisable to have the coal-store sufficiently large so that in summer, when not required for coal, and coke is abundant, it can be converted into a store for that residual. When employed as a spreading-floor it should by all means be paved with fire-bricks, as stone is liable to crack with the heat. When not used for that object ordinary common paving will answer the purpose. As already mentioned, it is highly desirable that the coke should be sold as speedily as possible after it is produced.

*Purifying-House.*—The purifying-house has the sides open, to permit a good current of air to pass through the locality and carry off any noxious gases. There should also he a ventilator in the roof, so that in the event of the lutes "blowing," the gas may escape readily at the top. The roof of the purifying-house is usually of wooden principals and tiles. Iron would be very speedily destroyed by the action of the sulphur emanating from the waste purifying material. In some works the purifiers are uncovered, which has the inconvenience of unnecessarily exposing the men at times to the inclemency of the weather, and ought always to be avoided by a suitable roofing.

According to a modern construction, the purifying-house is built of a ground and two upper floors, of which the uppermost and lowest serve as reviving-floors for the oxide. The purifiers are on the first floors, and in the centre of each purifier is a shoot, through which the foul oxide passes to the floor below, and when requisite the door on the top of the shoot is luted. By mechanical appliances the oxide is lifted from the bottom to the top floor, from where it passes down a shoot into the purifier to be charged. The saving of labour and the rapidity of action are both recommendations to this system of working.

*Engine, Boiler, and Exhauster House.*—In the most moderate-sized gas-works at the present day the steam or gas-engine is an important auxiliary. Formerly the only use of an engine in a works was for pumping water, or for keeping in motion the wet lime purifiers, and in many works of considerable capacity, where neither of these was requisite, no engine existed. The use of clay retorts has caused motive power for working the exhauster to be introduced into works of all dimensions, except the very smallest kind. In large works the engine, boilers, and exhauster, being attended by the same man, are generally in the same building, and more care is usually displayed in this than any other part of gas-works. The edifice is often constructed with taste, and is no doubt an inducement to the men who have charge of the machinery to keep it cleanly and in order with the building itself. In small establishments the exhauster is generally adjoining the retort-house, the stoker having charge of it. The improvements recently introduced into gas-engines, by which they are rendered practical and economical motors, should induce every gas manager to adopt them, on account of their safety, efficiency, and as an example to consumers to employ them.

*Station-Meter and Governor-House.*—These, like the engine-house, should only be accessible to the manager or foreman, or the man in charge. When there are several gas-holders together, it is not uncommon for the station-meter to be placed close to them, and the valves of the various gas-holders fixed adjoining the meter-house. On other occasions there is a distinct house for the valves; but more commonly they are attached to their respective holders. The governor is sometimes placed in the same building as the station-meter, but more frequently a detached building is constructed expressly for it. In large works there are several lines of mains issuing from the works, each of which has its corresponding governor, with the various pressure-gauges and pressure-registers. And in establishments situated at a distance from their distributing stations a telegraphic communication exists between the various localities, as well as the company's offices.

*Chimney or Stack.*—High stacks possess an advantage in consequence of their great draught permitting a reduction in opening of the damper; but against this they present the evil, that, if the dampers are not well looked after, the draught occasioned by them will cause the fuel in the furnaces to be consumed very extravagantly without any good result. High stacks are constructed principally for the purpose of carrying off the smoke or offensive products to a great height, where they are diffused over a large space, and a nuisance which otherwise would exist is prevented. In some chemical manufactories the stacks are made of great dimensions,—one near Glasgow is 400 ft. high. By means of this all noxious gases that may be generated are carried to and issue from the top of the chimney, without the least prejudice to the neighbourhood. The largest chimney for a gas-works is that of the Edinburgh Company, and is a fine piece of building, being 329 ft. above the level of the ground, perfectly plomb, and without the slightest crack or fissure throughout the height. The current therein, when in ordinary working order, is equal to an exhaust of 2½ in. of water, a strong current in an ordinary chimney seldom exceeding ½ in. exhaust. The cost of this stack, with the lateral flues, was upwards of 4,000*l*. Chimney stacks for gas-works are constructed in various manners, the simplest and cheapest being the square form; but these are somewhat unsightly, and, offering greater resistance to the wind, require to be built strong accordingly. Some stacks are made circular and others octagonal; the latter, when surmounted on a square pedestal, with a neat capital on the summit, has a remarkably good appearance, while the cost does not exceed that of the circular form. Chimney-stacks, unless when placed in the centre of the beds, should never be built in the retort-house, as they occupy the space unnecessarily. Wherever constructed, they should always be detached, and, on account of their great weight and height, extraordinary precautions are necessary in their foundations. The area of these must be determined according to the degree of solidity of the ground where erected; the softer the soil, of course the greater will be the area required for the footings. The pedestal for the base is usually square, one side of which is one-eighth of the total height of the shaft. Stacks for gas-works are always lined with fire-brick either for a portion or the whole of the height. Sometimes the lining is detached from the chimney, leaving a space for a current of air to pass between the former and the latter,

which prevents the stack cracking. Small chimneys are usually constructed entirely of fire-bricks. A mistaken notion often prevails, that by materially contracting the stack at the top, the draught is increased: this, however, as already shown, can only occur when it is of too great capacity. The stack, although tapering on the exterior, is internally nearly of one uniform area throughout; there being offsets at certain distances, according to the height and form. In erecting, every eight or ten courses should be built with hoop iron; when this is not done the stack frequently cracks, afterwards demanding the use of hooping on the exterior, which is unsightly. At many large works a number of dwarf chimneys are erected, each of which is about 1 ft. 6 in. or 2 ft. square internally, and serves for three or four double settings. The area of a chimney compared with the number of benches leading to it is the main consideration, irrespective of the height.

Very recently Mr. Valon has adopted the use of a separate dwarf chimney to each bench of retorts, with beneficial results, as the temperature of the settings is maintained with greater regularity than by the ordinary method, whilst any leakage from the retorts is readily detected. The ordinary chimneys in gas-works vary in height from 35 ft. to 150 ft. above the level of the ground; their cost for a given height depends mainly on their internal area and the nature of the foundation. The ground being favourable, the price of a square chimney, 35 ft. high, with an internal area of 4 square feet, will not exceed 35*l*. An octagonal or circular stack of 8 ft. internal area, and 60 ft. high, under the same conditions as the former, will cost about 85*l*. A similar stack of 10 ft. area, and 100 ft. high, would be 180*l*. to 200*l*. Where there is no probability of a nuisance being occasioned by low chimneys, for the ordinary use of a gas-works they are not required to be more than 45 ft. high.

## TUNBRIDGE WELLS GAS-WORKS.

THE accompanying drawings illustrate, so far as they go, modern gas-works which have been erected for the Tunbridge Wells Gas Company, from the designs of Mr. R. P. Spice, C.E., of Parliament-street, Westminster.

This is an instance of that spirit of private enterprise for which Englishmen have rendered themselves famous, and their country great and prosperous, and we certainly are not amongst those who desire the time when, by absorption into Governmental centres of the various great industrial undertakings of the country, this spirit of enterprise, which has been the corner-stone of the edifice of our commercial greatness, should be so discouraged and enervated as to sink into a subordinate place.

The old works at Tunbridge Wells had become unequal to meet the wants of the gas-consumers, and were so "cabined, cribbed, confined" as not to admit of further extension. This state of things rendered it necessary to provide entirely new works of larger capacity. Accordingly, application was made to Parliament for power to enable the company to provide the means for meeting the demand, and ultimately the usual powers and privileges were obtained, accompanied by those safeguards which have been devised by modern legislation in the interest of the British public. The only contention in this instance, between the company on the one hand and the ratepayers on the other, was as to the site of the new works. In any locality where nature has been lavish with her charms, so that the scenery is unusually attractive, it is difficult to find a convenient corner in which to plant gas-works, the name of such a concern conjuring up visions of ugliness, smoke, vile smells, and dirt, and the opposition to the first site selected, in a sequestered valley at Tunbridge Wells, was of this sentimental character. However, in the end, after three applications to Parliament, the present site was decided on, and the works erected. They have been designed to embrace all, or nearly all, the scientific improvements introduced into gas-working in recent times, by which the best results are attained; first, as to the quantity of gas obtainable from the coals carbonised; secondly, as to the quality in illuminating power and purity; and, finally, as to economy in all those items of expense which go to make up the first cost of gas, and it is believed that, in all these respects, success has been achieved. It is further hoped that public opinion has not been shocked by that of ugliness, a fear of which inspired the old opposition, and more than that, it may be anticipated that a view of these structures, which have been raised on the hill-side to the left of the down-line of the South Eastern Railway, may give pleasure rather than otherwise to the tourist and wayfarers. The builder was Mr. Henry Potter, of Hackney. The various fittings and apparatus required were supplied by the following firms:—Cutler & Son, Millwall, gas-holders, condensers, and scrubbers; Messrs. Cockey & Son, Frome Selwood, purifiers; West's Gas Improvement Company, of Maidstone, retorts and fittings of stack; Korting Brothers, patent steam-jet exhausters; Abbot & Co., Gateshead, hydraulic crane; Owens & Co., Whitefriars, hydraulic lifting apparatus and steam-boilers; Head, Wrightson, & Co., Stockton-on-Tees, iron roofing; A. Wright & Co., Millbank-street, Westminster, station-meter and governors; Bailey & Pegg, Bankside, London, trunk-mains from works to the town. The cost has been about 70,000*l*., including land and Parliamentary expenses.

The following remarks on coal-stores and retort-houses, with reference to the works we have illustrated, are from a book on "Gas Manufacture and Distribution," by Mr. W. B. King:—

"The primary object to be aimed at in setting out the ground-plan of a new gas-work is the arrangement of the several parts of the whole, from the coal-store, and the reception of the coals into it, to the gasholder, so that the cost for labour throughout may be reduced to the lowest practicable amount; and to this end the designer and the manager should direct their closest consideration.

It may be taken as an axiom that it is a waste of power to lift any quantity of material daily and hourly in perpetuity in any case where the same material may be made to fall into its proper place instead of being lifted; and the difference between the two will be felt in the annual balance-sheet of the undertaking.

This fundamental principle of causing all weights to fall instead of being lifted, except in the single point of raising the coal by West's system, by an endless chain of buckets, kept in motion by a small steam-engine, is illustrated in the design which accompanies these remarks.

The railway by which the coal is brought to the works is some 20 ft. above the general level of the ground of the works. The trucks will run into the coal-store, and, having dropped their contents, will go through to the tail of the siding; the coal, being admitted as it may be required to the breaker underground, is raised by a chain of buckets into overhead fixed hoppers, whence it falls to the travelling hoppers, and thence into wagons, which are, with a very small amount of muscular energy, wheeled into each retort, and as they are withdrawn thence the charge of coal is deposited therein in a layer of uniform thickness.

When the charge has been worked off, the resulting coke is drawn, by the aid again of a mechanical appliance, into barrows, and quenched; and then, running upon the level floor to a near opening in the side wall of the retort-house, each loaded barrow is run down an inclined plane from the retort-house floor to the coke-yard, the general level of which, in this case, is intended to be about 2 ft. to 2 ft. 6 in. below the floor-line of the retort-house.

The same remarks applied to coal and coke will equally apply to the water used, not only in a retort-house, but generally upon a gas-work, not a single gallon of which should ever be lifted by the direct application of muscle and sinew. With ample boiler-power, steam can be raised at the lowest possible cost upon a gas-work by means of a slow-combustion furnace, fed by breeze or fuel of the cheapest kind, so that the cost of raising water into elevated tanks is infinitesimal compared with that of raising it by manual labour, even from very shallow wells. The convenience and economy, therefore, are great, in having at hand, in close connexion with each bench of retorts, and everywhere about a gas-work, a good supply of water, obtainable at sufficient pressure by turning a tap or valve.

The plan and elevation of the retort-house annexed will bear favourable comparison with most others for economy in first cost, general effect in appearance, practical utility, and comfort of the workmen employed, taken in connexion with Mr. West's system of charging and drawing retorts. Special attention is called to the application of ridge and valley roofing, with abundant ventilation, and it may be mentioned that in this instance, each bench of retorts will have its own separate hydraulic main, commanded by a valve fitted on at the back, and connected with a main supported on iron standards, resting on the retort-stack, the gas being taken therefrom at convenient distances, and delivered into a main led along the inside of the wall of the house, which latter main is suspended by rods, the length of which is capable of adjustment by nut and screw, all converging to a point or points, from which the gas will be taken by the exhauster, and sent forward through the condenser. The productive power of the retorts for which this house has been designed is equal to one million and a quarter cubic feet of gas in twenty-four hours."

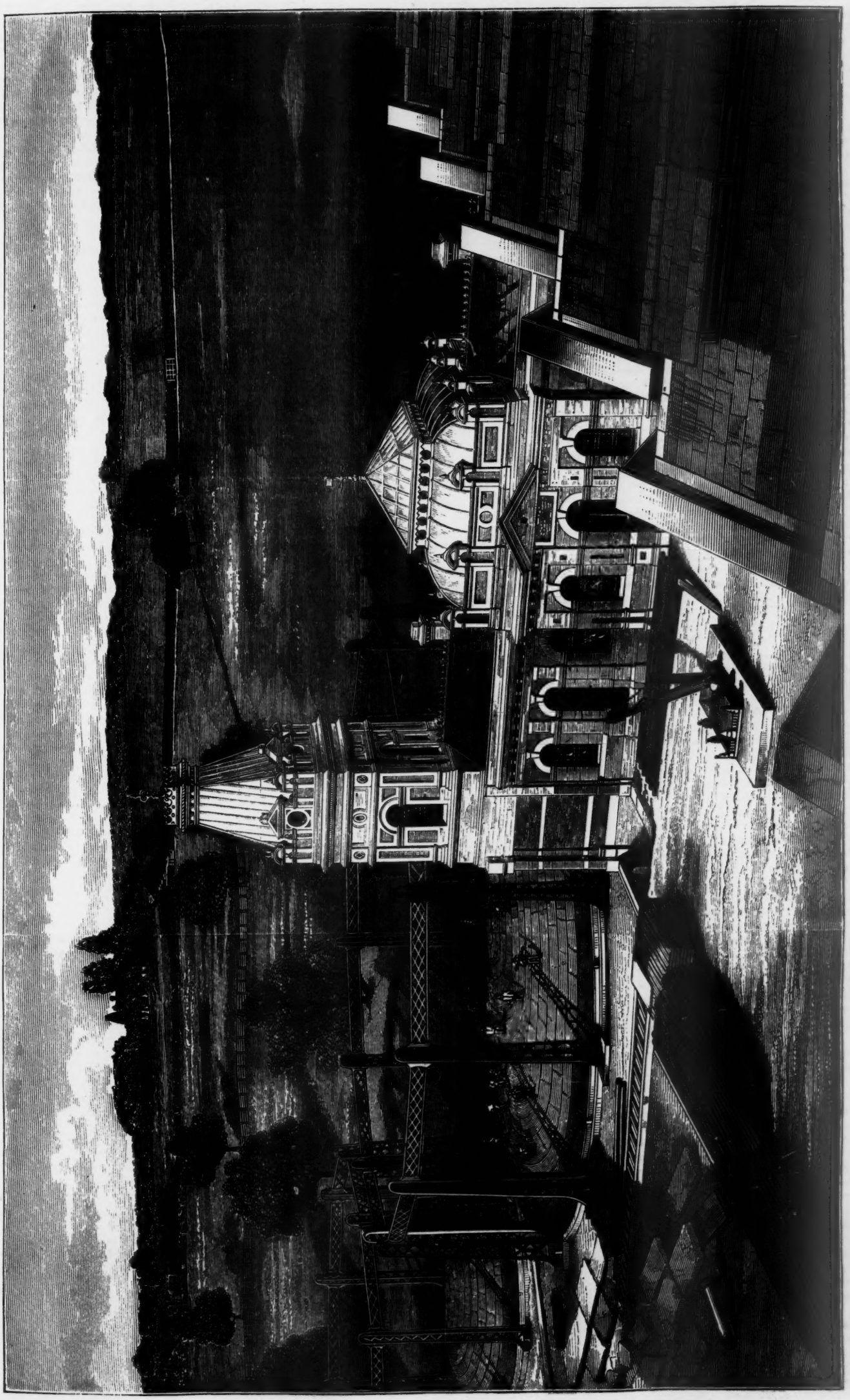
## A NEW WHOLESALE MARKET AT LIVERPOOL.

THE Markets Committee of Liverpool have unanimously agreed upon the erection of a spacious new wholesale market, in consequence of the present inadequate accommodation for this branch of market business. In the course of a discussion on the subject last week, the chairman of the committee stated that there was at present no proper market accommodation in Liverpool for live fowls, and one large poultry dealer had informed him that he had frequently as many as 800 or 1,000 geese arriving in Liverpool, for which he could find no market-space whatever. It, therefore, appeared to him that they required a very large space of ground on which to erect the market. The intended new market is to have space for the wholesale disposal of poultry, pigs, and other live stock, as well as vegetables and general agricultural produce, the chairman stating that the demand for the last-named articles was so great that the railway companies had taken the matter up, and the London and North-Western Company had actually set up a market of their own. The site of the intended new market is at the north end of the city, and known as Nash-grove, already in the possession of the corporation, and originally intended for the erection of workmen's dwellings. The area of the proposed market is 7,480 yards, or upwards of an acre and a-half in extent, the whole of which, at the very least, the chairman said, would be required. The estimated cost of the market is 100,000*l*., the value of the site being set down at 80,000*l*., and the building itself at 20,000*l*. Speaking of the site, the chairman observed that it might be said it was wanted for workmen's dwellings, but if those who thought so would take a walk around the locality, they would see that there were at present large numbers of unoccupied houses.

## THE ROMAN PAVEMENTS AT WOODCHESTER.

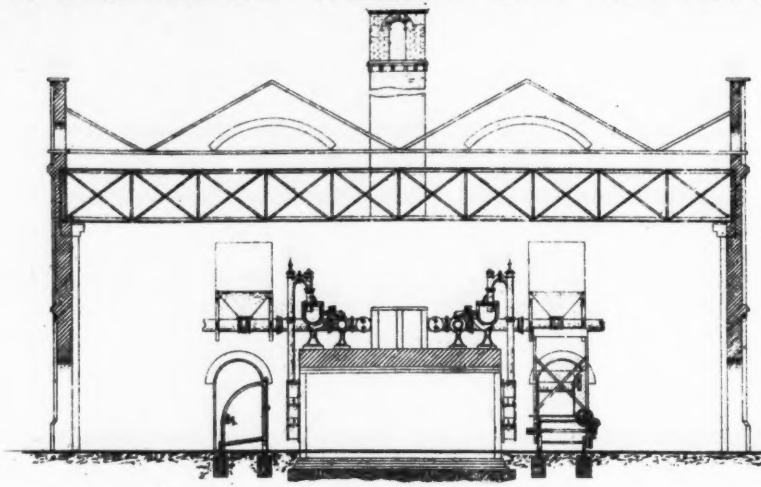
ANTIQUARIES will learn with much gratification that, after being covered with earth for many years, one of the magnificent pavements of the great Roman villa at Woodchester has been again laid open to view. This pavement has been very carefully depicted by Lysons, under whose care it was first opened, in 1793. It was afterwards re-covered, as were all the others, since it was found impossible to preserve them in any other way, through the cost of raising suitable roofing and buildings. The clearance recently effected has been done through the exertions of the Rev. F. Smith, the newly-appointed Rector of Woodchester, aided by a small grant from the Bristol and Gloucester Archæological Society. A visit will be paid to the remains on Thursday, the 23rd, by that society, and, according to present arrangements, the pavements will remain open for public inspection, at a small charge, until the 5th of August, after which it is proposed to re-cover it again with earth. It is greatly to be hoped that funds may be forthcoming to erect a protecting building and roof over this one pavement, to ensure its being always open for public inspection, that visitors to Woodchester may be able to see at least one pavement, as a specimen of the others, which it may hardly be possible to roof over, in consequence of the vast extent of the villa. The colours of the pavement prove to be but little, if at all, injured by the length of time that has elapsed since its discovery.

**Mr. Henry Robinson, M. Inst. C.E.**, has been appointed Professor of Land Surveying and Levelling at King's College, London.



TUNBRIDGE WELLS NEW GAS-WORKS.—MR. R. P. SPICE, C.E., ARCHITECT.

# TUNBRIDGE WELLS GAS WORKS.



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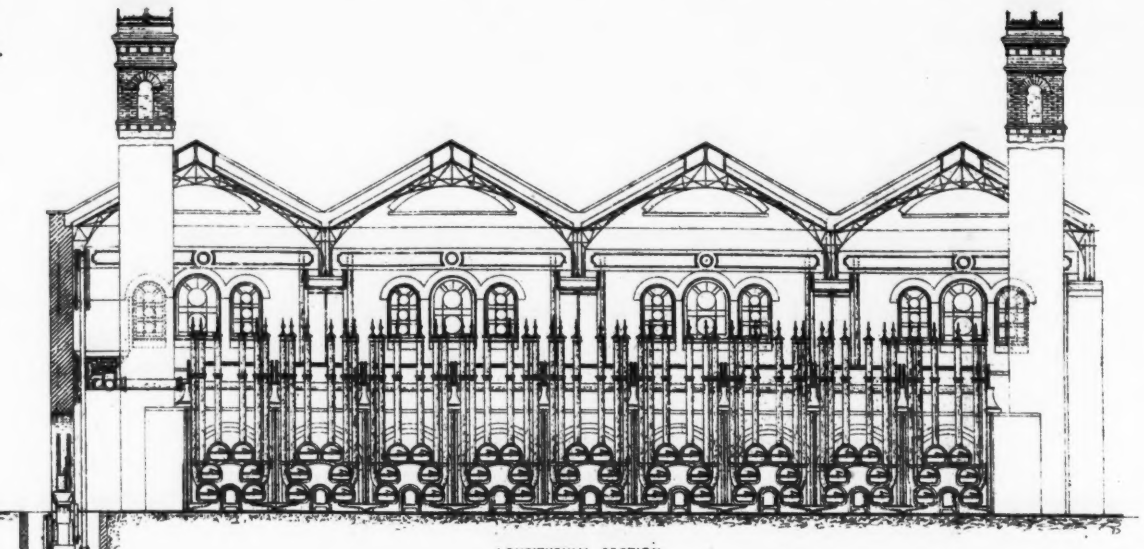
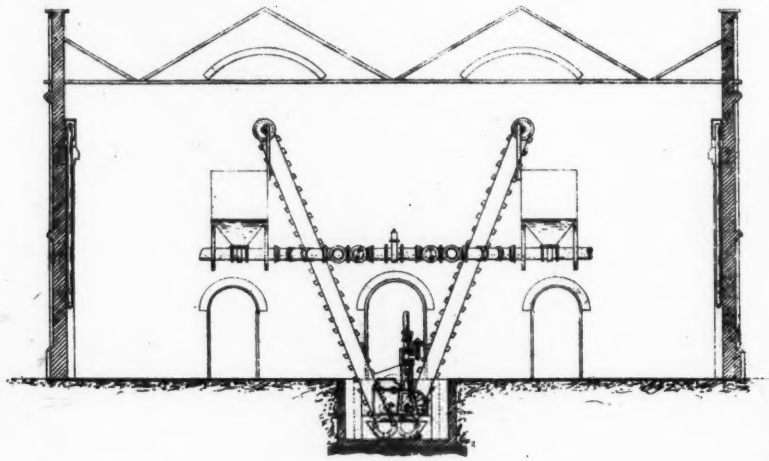


LONGITUDINAL SECTION

## GENERAL ARRANGEMENT OF RETORT HOUSE.

FOR WEST'S DRAWING AND CHARGING APPARATUS AND WITH WHITE & WEST'S PATENT AUTOMATIC VALVE DIP PIPE OVERFLOW SEAL AND REGULATING VALVE.



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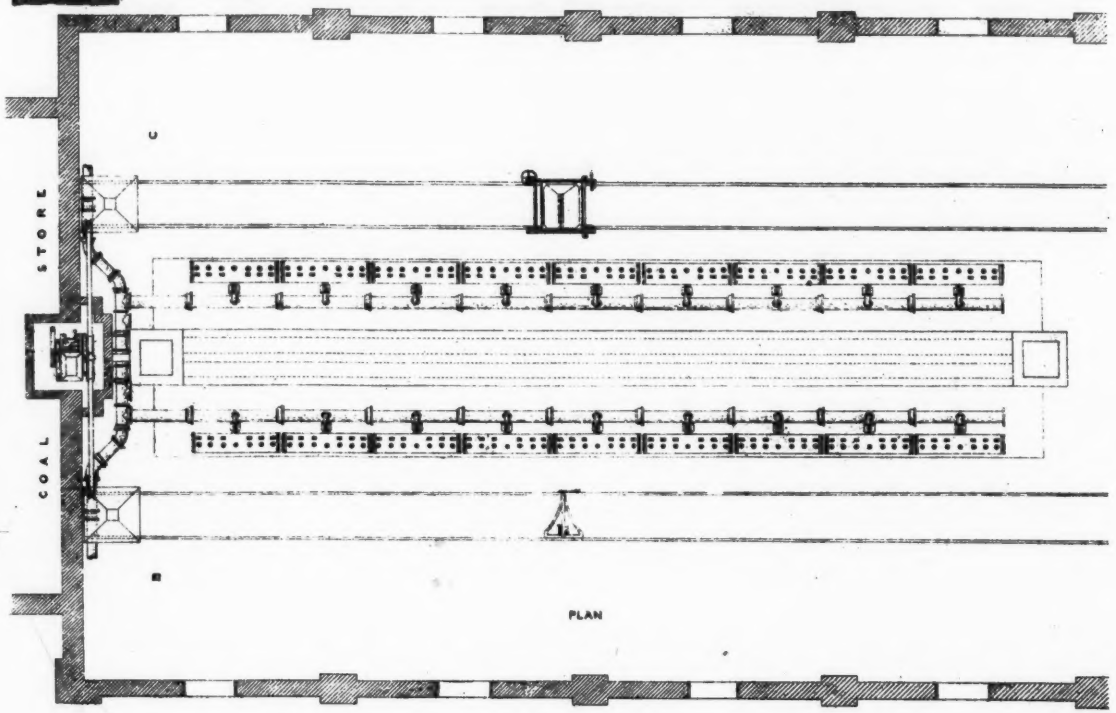


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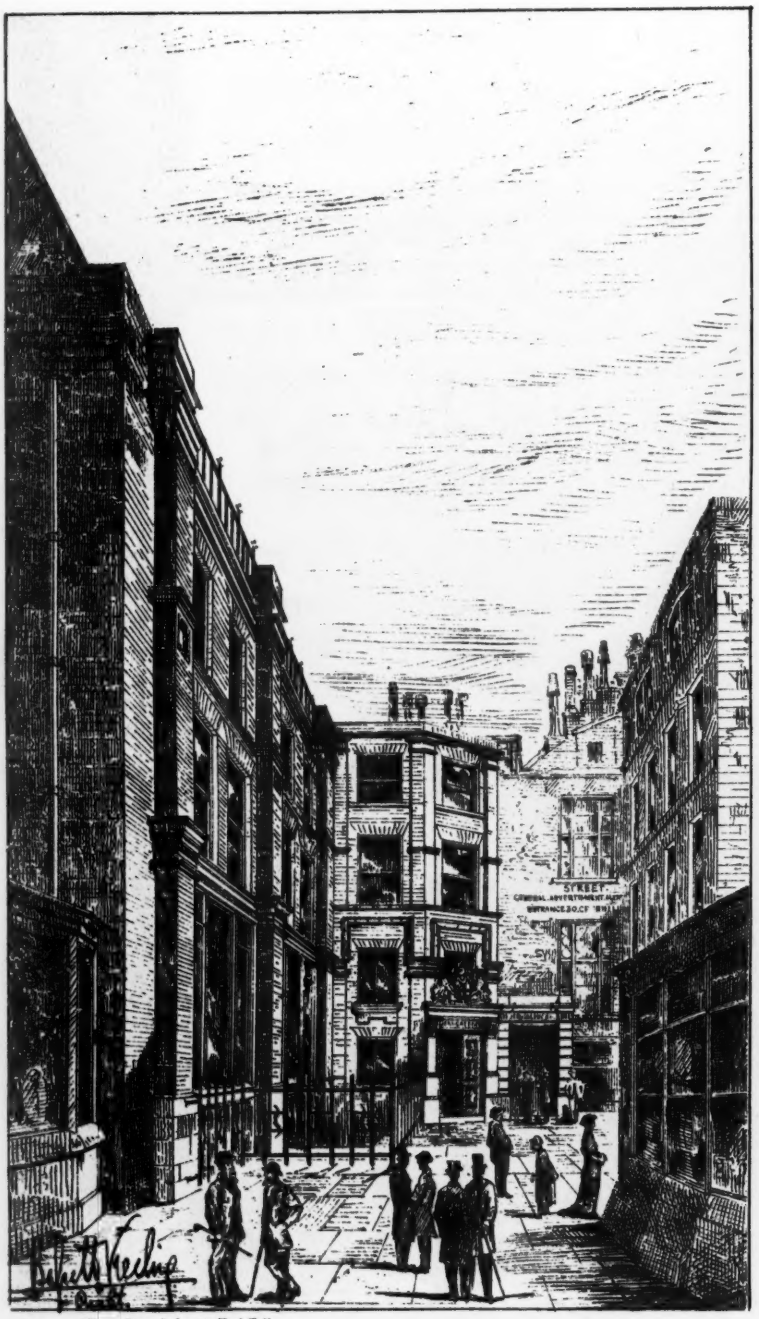
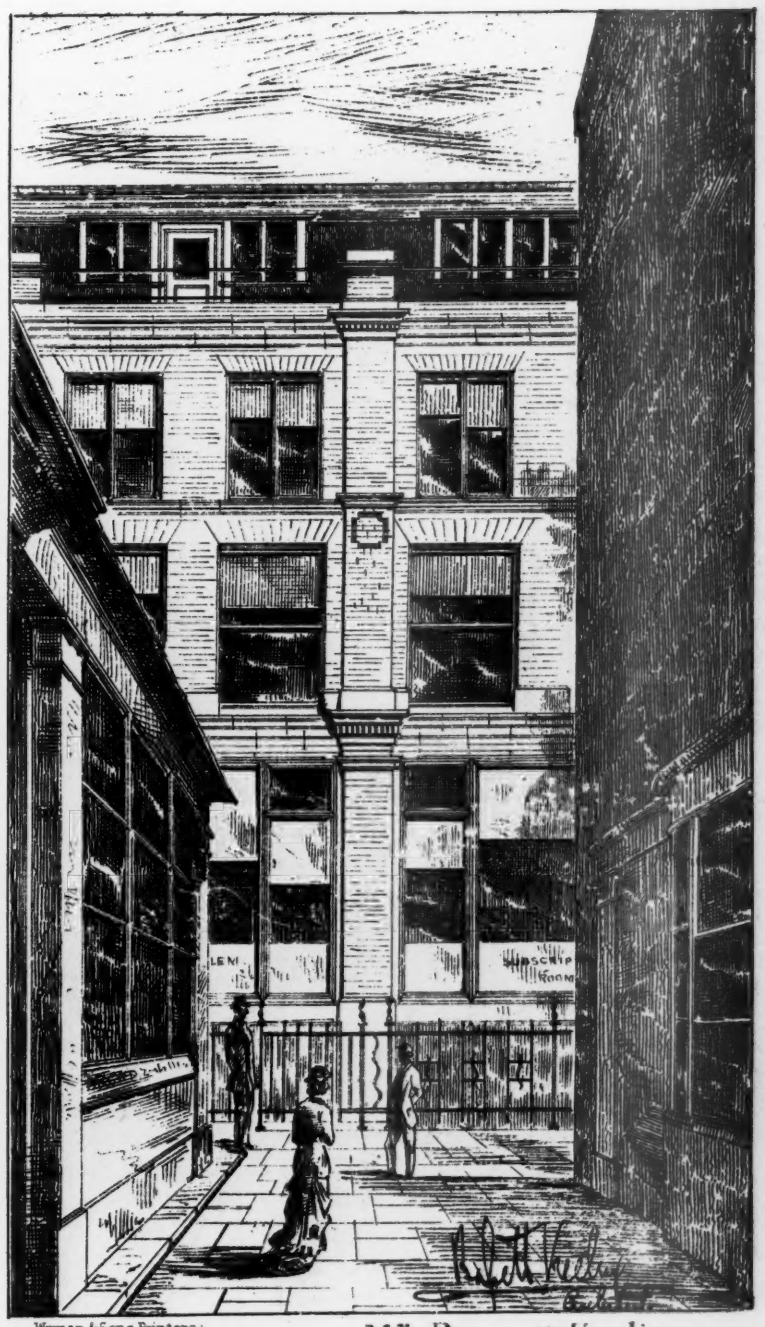


Whiteman & Bass *Photo-litho* 236 High Holborn

As approached from Birchin Lane.

THE JERUSALEM CO

AS REBUILT



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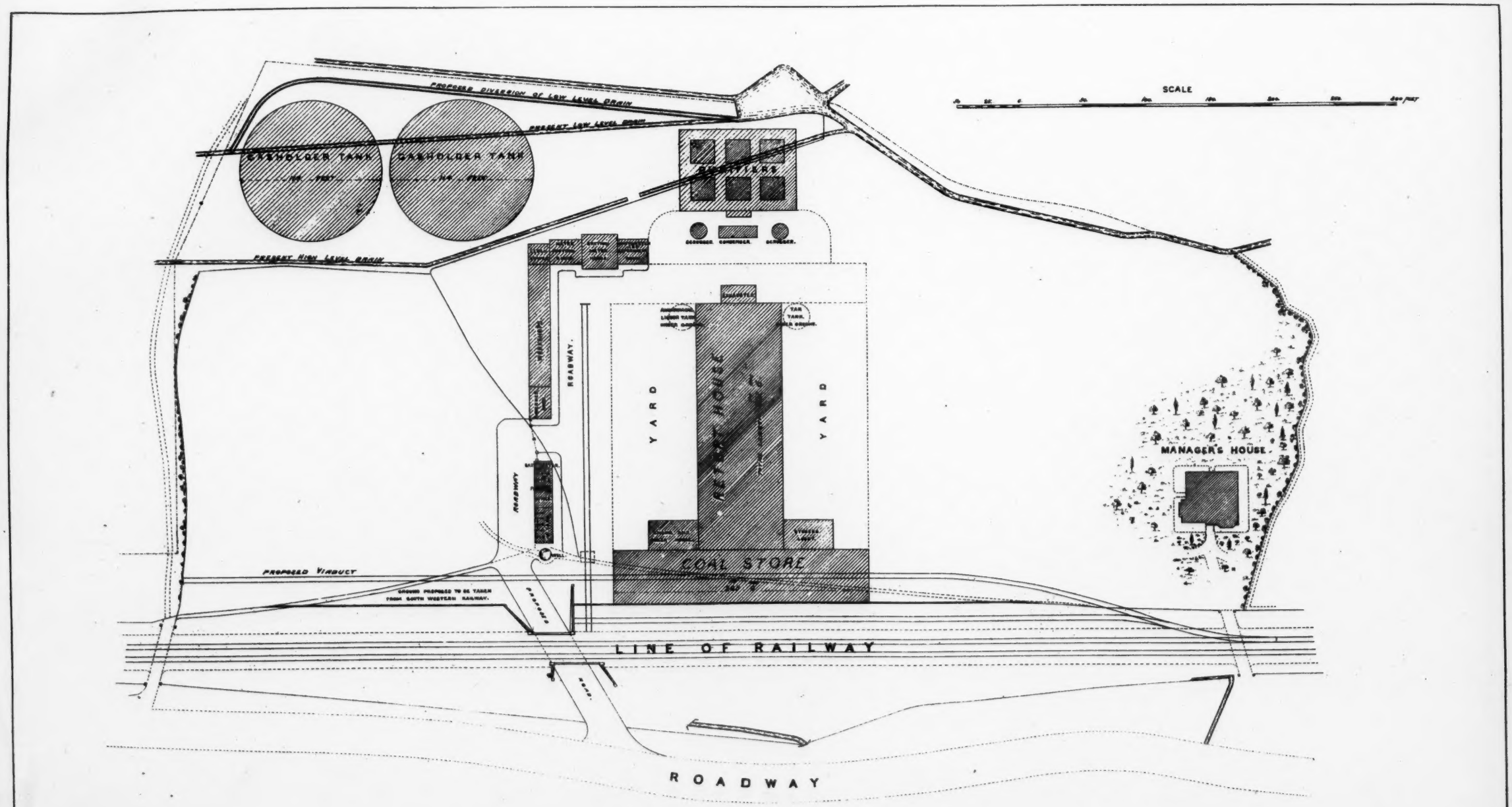
REBUILT.

As approached from Cornhill.




# TUNBRIDGE WELLS GAS WORKS

## PLAN OF SITE & BLOCK PLAN OF BUILDINGS

## THE "JERUSALEM," COWPER'S COURT, CORNHILL.

WE give in our present number a sheet of illustrations of the "Jerusalem" as recently rebuilt, showing the new building as seen from Cowper's-court, and also as it appears from the two narrow approaches to Cowper's-court, *i.e.*, through the passage in Cornhill immediately opposite the Royal Exchange and next door to the National Discount Company's offices, the other view being as approached from Birchin-lane. The old building it has replaced,—and to carry on the business of which the new one has been erected,—was known as the "Jerusalem Coffee-house," and its history as such carries us back considerably over two centuries to a time when the term "coffee-house" had a signification so utterly distinct from its present one that, like the "Jamaica," "Garraway's," and others, it has for generations been familiarly known as it is now designated, simply the "Jerusalem." Established early in the seventeenth century for the convenience of those who liked to talk business over a cup of coffee, at that time a somewhat rare and costly beverage, it soon acquired one of the special features it has retained ever since, that of a rendezvous for merchants, brokers, and captains interested in trade with the ports of the Mediterranean.

The original building was destroyed in "the Fire of London," and in excavating for the foundations of the present building, large beams in a more or less charred condition, and portions of a curiously-constructed tesselated floor, were discovered, which may have been either portions of the ruins of the original building, or of its successor, which was also destroyed by a great fire (on March 25th, 1748), when eighty-eight houses in Cornhill shared the same fate. Though the vaults and foundations of the building the present structure has replaced were of the most solid and massive character, it is apparent from this and other evidences that after the fire of 1748 little care was taken to remove the *débris* before rebuilding, which may be explained by the total absence of the terms "District Surveyor" or "Metropolitan Board of Works" in the records and chronicles from which we have culled much more of the history of the "Jerusalem Coffee-house" than would be appropriate in this notice of the new building.

The prosperity and fame of the "Jerusalem" were coincident with the rise to greatness of the East India Company; and it is asserted by some that the Company was actually founded at the "Jerusalem," and the fact that it was more frequented by East India merchants at the time than any other place in London, lends some countenance to this hypothesis.

The coat of arms over the entrance to the new subscription-room is that of the defunct East India Company, and was purchased at the sale of the old Company's House in Leadenhall-street, when demolished to make room for a large block of offices by Messrs. Tite & Clifton, embracing East India Avenue. It was then placed over the entrance to the old building in Cowper's-court, where it remained until the rebuilding of the "Jerusalem" in its present form, where its position forms a link with the past history of the institution, which, though marching with the times in adapting itself to modern requirements, still retains its original characteristics.

Of course, the old associations which have so long bound it to the East will be preserved; but the increase in the commerce of Great Britain has created the necessity for an extension of the scope and influence of the "Jerusalem." Every consideration likely to affect merchants and others having mercantile relations with India, China,' Australia, New Zealand, the Cape of Good Hope, &c., will be dealt with. Files of the principal newspapers belonging to these places, as well as those of St. Helena and other intermediate stations, will be accessible to members, and every sort of information regarding the arrivals, departures, or casualties of ships.

It is worth noticing, in connexion with this, that the "Jerusalem" possesses a chronicle of the arrivals and departures of all the ships of the East India Company's service.

Every afternoon an exchange is held, attended by ship-owners, ship-brokers, and merchants, for the purpose of arranging for freights or charters, and other similar transactions. It is in contemplation to arrange for the establishment of telephonic communication, of course for the use of subscribers only.

On the ground floor is a spacious hall, in which members meet for the discussion of business.

On the first floor, which communicates with the ground floor by a private staircase, is a large and handsome reading-room for the use of the subscribers. This room will also be used for the sales of ships, produce, &c.

The rooms on the second and third floors, and those on the first, second, and third floors over the entrance to the subscription-room, are to be let as offices, and with a separate entrance facing the approach from Birchin-lane, are designated "Jerusalem-chambers."

The basement under the ground-floor subscription-room forms one spacious and well-lighted room, with a floor area of over 2,000 ft. This room is approached from the outside by a flight of wide stone steps, and has also an internal staircase communicating with the subscription-room over.

A peculiarity of this property, which is leased from Lord Cowper, is that, in addition to the land covered by the building, it includes very extensive cellarage, extending under the whole of Cowper's-court and some of the adjoining buildings.

The property being fully licensed, the whole of the basement, sub-basement, and the old cellars, have been let on lease to Messrs. Lavery & Co., of "Bodega" celebrity, who have fitted up the large basement-room, under the superintendence of the architect of the building, in the most solid and substantial manner, as a wine-room, with sandwich and cigar counters.

The floor is of white marble mosaic, all woodwork of teak, walnut, and wainscot, and wrought-iron is substituted for the wood "scantling" usually adopted; and though there is a total absence of any attempt at ornament or decoration, no expense has been spared to economise space and light, and to secure comfort and convenience. Though the general characteristics of their business will be maintained, some innovations and novelties have been permitted where a commensurate advantage could be secured.

In the planning of the new building, the difficulties of assimilating the rather complex requirements were considerably increased by the questions of light and air with which the site is surrounded, and though these have been all arranged without litigation or compensation, it has involved some peculiarities of arrangement and construction.

The building, though devoid of ornament, is constructed in a solid substantial manner, and may be considered fairly expressive of its purpose as the resort of business men of the most matter-of-fact and unemotional class.

The front elevation is of kiln-burned red brickwork (entirely without dressing or pointing) and dressings of brown Portland stone; the window-frames and sashes are of walnut, with plate-glass (that of basement being embossed so that the interior cannot be seen from the court). The treads to the staircase of chambers are of teak, and the whole of the wall of back elevations is faced with white glazed bricks.

The building has been erected by Messrs. Dove Brothers, under the direction of the architect, Mr. Bassett Keeling, of Weavers' Hall. There has been no clerk of works, the contractors' foreman of works, Mr. Puxty, having had the superintendence, under the control of the architect.

The constructional ironwork, which was a considerable item, has been supplied by Messrs. Homan & Rogers; the pavement lights and wine-lift are by Messrs. Hamilton; the marble floors in basement are by Mr. J. F. Ebner; and the gas-fittings and brass work are by Messrs. Richardson, Elson, & Co.

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**Exeter Hall.**—Six well-known men have guaranteed 25,000*l.* in order that the lease of Exeter Hall may be secured, and the building preserved for the use of the Young Men's Christian Association. Mr. J. D. Allcroft gives 5,000*l.*, Mr. R. C. L. Bevan 5,000*l.*, Mr. S. Morley, M.P., 5,000*l.*, Mr. G. Williams, the treasurer of the Association, 5,000*l.*, Mr. T. A. Denny 2,500*l.*, and Mr. E. Denny 2,500*l.*

**Font for Sheffield Church.**—Designs are sought for a font proposed to be set up in the parish church of Sheffield; as our advertisement columns show. More than one correspondent condemns the proceeding on the ground that perfectly competent architects are now engaged in the restoration of the building, and ought to be employed.

## THE CIVIL SERVICE ESTIMATES DEBATE.

THE sitting of the House of Commons in committee on the Civil Service Estimates on Tuesday last afforded one of those opportunities which occasionally recur for the airing of all kinds of minor grievances and suggestions, and what an American would call "notions," in regard to the matters under the control of the First Commissioner of Works. The ingenuity of some members in finding matter for complaint out of what the rest of the world regard as manifest improvements is really edifying. The skirmishing began upon the question of the vote of 112,577*l.* for public parks and pleasure-grounds. An Irish member led off with the complaint that Ireland got far too small a proportion of the money spent on parks and pleasure-grounds; and if, as Mr. T. Sullivan afterwards remarked, only about 6,500*l.* is spent on the Phœnix Park and 112,000*l.* on the London parks, and that the united area of the latter is not equal to that of the former, there does seem a disproportion. It depends, however, on what kind of park it is intended to keep up. A very large park, the chief value of which may be its freedom, as a kind of semblance of open country, may be kept up for less than a much smaller one in which ornamental gardening, a very expensive amusement, forms a part of the attraction. The large park may be sufficient unto itself, in its mere extent; the small park, not presenting the freedom and extent of open country, must be treated ornamentally to compensate for its limits in regard to space: it cannot be "wild," it must therefore be pretty. The next speaker, Mr. Magniac, quarrelled with the Government on this very point, and complained that so much of Hyde Park had been made into ornamental flower-beds that its use as a recreation-ground for the public was seriously obstructed. We doubt very much if "the people" will thank any member for this kind of protection of their rights. Our impression is that there is nothing the poorer classes appreciate, in this way, more than the sight of well-kept and gay flower-beds. The complaint that the large trees in Kensington Gardens are decaying is more to the purpose, and was not denied by the First Commissioner, though it must be remembered that, after all, trees have their allotted span like human beings, and it is looking for rather too much from a merely human First Commissioner to expect him to confer immortality upon them.

That too large a part of the Regent's Park is inclosed is a complaint which, in the interest of the general public, may, perhaps, appear reasonable; it should be remembered, however, that residents in a park have their reasonable rights and expectations, and, perhaps, landlords whose house property will be depreciated in value if the privileges attached to it are interfered with, may think they have some claim to be considered. As for the site for the Byron statue, which was declared by the same speaker to be most unsuitable, the question is, whether the Byron statue can be put in any place where it will look suitable. If it were a good statue, no one would complain of it being where it is, though in that case one would feel the desire to open it out a little by some re-arrangement of the inclosure and railing.

From the reply of the First Commissioner to his critics it would appear that some other suggestions were made which were not reported in their proper place. Some one appears to have renewed the plea for the resuscitation of the prostrate architecture of the old Burlington House portico, the fossil remains of which are now a puzzle to the curious on the river margin of Battersea Park. Mr. Adam thinks the cost of re-erecting it "a very doubtful expenditure." If he meant that it would not be possible to make it pay a per centage, no doubt he was quite right; but it seems a very pitiable thing that a piece of rather historic London architecture should lie rotting on the ground, instead of being preserved in a place where it would be effective, and even perhaps useful. Surely it might be made to add a beauty to Battersea Park itself, as an adornment to one of the entrances, or as the front of a shelter; and to set it up again so near its present resting-place would not cost very much. Another suggestion which was only to be gathered from the First Commissioner's reply, as reported in the *Times*, was that trees should be planted near the Marble Arch, in regard to which it was stated that there was in the Office of

Works a general scheme for the improvement of the Park,—a statement of some interest. Before this is carried out (if it is to be), we may presume that something will be publicly known about it; in the meantime, we may say that if it includes planting up near the Marble Arch, we are entirely with the scheme as far as that goes. The Arch at present stands up in an almost unsightly and unreasonable manner from the barest corner of the Park, and very much wants some masses of foliage to flank and lead up to it. Among the curiosities of the debate (or conversation, we may perhaps rather call it) was the indignation of an honourable member at the laying down of gravel (which he called "mud and soft earth") for riders on the eastern drive of Hyde Park, whereby, he said, pedestrians were splashed, but for which the Commissioner had received divers letters of thanks. It may be presumed the honourable member for Preston does not ride in the Park: pedestrians and equestrians often take very different views of such matters. But, then, the gravel was laid down "in the expectation of June, July, and August being fairly fine months."

"By Heaven, this gallant would command the sun!"

Certainly, the First Commissioner has been badly used in that respect.

One suggestion that was made for an asphalte walk from Marlborough House across St. James's Park recalls a much larger suggestion of our own some little time since. Mr. Callan's suggestion about the asphalte is not otherwise than to the point, for the walk from the park suspension-bridge up to the Mall is very soft and clayey in wet weather. But the fact is, that we believe a carriage-bridge over the water at this point, connecting St. James's-street and Pall Mall more directly with the Westminster and Victoria district, is a want that will have to be provided before long. The huge blocks of residences that have been built between Birdcage Walk and Victoria-street, ugly as they are, are what may be called residential facts, so are the masses of residences, and the Army and Navy Stores, in Victoria-street. Carriages to the latter come in crowds, and have mostly to go a very roundabout way. The improvement we here allude to formed part of a very extensive suggestion for the future of the Westminster district which we published a little while since, and which members of the Legislature who are interested in the laying-out of London might do well to look at; for some, at least, of its provisions, we are convinced, must be carried out.* The whole of this part of London is changing rapidly and inevitably, and might just as well be changed on a scheme as allowed to grow up by accident. As to this particular part of the suggestion, we may merely add that by a little give and take of levels it would be possible to arrange a bridge so as not to interfere with the walks along the park at all; the upper walk by the Mall would cross on the carriage-way level, and the lower one by the water would be taken under the carriage-way just as it is under the bridge over the Serpentine between Hyde Park and Kensington Gardens; the carriage-way would have to rise a little to the bridge in order to give the necessary height, and that is all. The bridge, if properly treated, might be made a real ornament to the park, much more so than the present suspension bridge, which, moreover, interferes with the rowing in summer and the skating in winter very materially, while our proposed higher bridge would leave the water-way quite unobstructed.

Having skirmished about the parks, the committee were brought again into a lengthy statement of grievances by the vote of 35,000*l.* for the Houses of Parliament. In what this sum is expended or to be expended we do not precisely understand; but it raised a cloud of complaints at once. The Reporters' Gallery was absurdly too small; the Ladies' Gallery (an old bone of contention) was contemptible. Mr. Sullivan often took foreign ladies to the gallery, and wished the other members could see how American ladies turned up their noses,—"always pretty ones,"—at the accommodation provided for them. He concluded with a recommendation that during the recess members should take into consideration the possibility of providing a new House worthy of the country; so there is a holiday task for honourable members in the intervals of grouse-shooting. This proposal, however, seemed to excite considerable alarm, and the probable expense was dwelt upon by some members, while Mr. Peddie (who is, we believe, the only architect in the House) made some practical remarks apparently in reference to the causes of complaint in the present House (not reported), and hoped that in any new House that might be built members would be so seated that they might all face the speaker and the greater part of the assembly. A great difficulty, of course, is that while larger accommodation for strangers, ladies, and the press is called for, the House could not be much enlarged without making it inconvenient and harassing to speakers. Indeed, even as it is, speakers with weak voices or any want of clearness of speech are heard with difficulty. However, we do not apprehend that a new House of Commons will be constructed just at present. One member, it may be observed, seemed to think an attack was being made on the architecture of the Houses of Parliament, and defended it as "one of the finest specimens of Gothic architecture in the world," only complaining that the smoking-room was very uncomfortable; a charge which seemed to excite a great deal of sympathy. Lord R. Churchill reminded the House that at the time when the building was erected smoking was considered as a vice; but now he anticipated (and no doubt correctly) that any attempt to improve the smoking-room would meet with support on all sides quite independently of party ties. Probably it would; but surely there should be a separate smoking-room for each party in the House? How are two Government members to unburden their minds over a cigar when two Opposition spies are seated close to them? One might as well bring members of the Reform into the St. Stephens', or members of the Conservative into the Devonshire. The widening of Parliament-street was brought into the discussion; but that, as was pointed out, was a matter to be considered in connexion with the large scheme for concentrated Government offices.

Another subject which followed elicited a very general consensus of opinion, in which we entirely concur, as to the great delay in the completion of the Ordnance Survey. This has been dragging on interminably, and unless it is completed soon, it will be nearly time to begin another to take in new changes. The work is, it appears, a matter of contract, and any material hastening of it must be at the cost of increased expenditure, if the work is to be thoroughly done. Of course this latter conclusion is a *sine quâ non*; a hastily-finished survey would be sure to contain many inaccuracies, and would be useless because unreliable at any point. But it seems a matter in which some increased expenditure in procuring an expeditious completion would be very wisely incurred, and for a purpose highly advantageous to the public.

It is to be regretted that the subjects which were discussed on the occasion alluded to do not seem to interest many of our legislators, for it appears that matters were in a position for a count-out at one moment of the discussion. But it must be admitted that those members who take part in discussing this class of subjects show some desire to make up for the paucity of numbers by the decided character of their opinions and expressions.

* See *Builder*, September 21, 1878.

## A STEP TOWARDS OPENING THE BRITISH MUSEUM ON SUNDAYS.

ON Saturday afternoon, July 10th, a deputation from the Sunday Society had an interview with the Trustees of the British Museum at that institution. The deputation was headed by the Earl of Dunraven, and was so numerous that many were unable to get beyond the entrance to the Council Chamber, where the interview took place. The trustees present were Earl Sydney, the Duke of Somerset, Viscount Sherbrooke, Right Hon. Spencer H. Walpole, M.P., Sir Henry C. Rawlinson, K.C.B., Mr. W. Spottiswoode, Pres. Royal Society, the Rev. F. Hanbury Annesley, Lord O'Hagan, and Mr. F. Winne Knight, M.P. Among the deputation were Lord Dorchester, Thos. Burt, M.P., Sir Arthur Hobhouse, K.C.S.I., Sir Charles Palmer, bart., Sir Edward Sullivan, Major Thos. Gaisford, Major R. R. Noel, Professor W. H. Flower, F.R.S., Professor Corfield, M.D., Professor Plumptre, Mr. George Godwin, F.R.S., Mr. George Romanes, F.R.S., Mr. F. J. Barnwell, M.A., Mr. Arthur Cates, F.R.I.B.A., Mr. Thos. Taylor, J.P. (Oxford), Mr. Lewin, Mr. Hodgson Pratt, Mr. Mark H. Judge, M.R.S.L., Mr. W. Cave Thomas, F.S.S., Mr. James Hopgood, J.P., Rev. J. Panton Ham, Rev. Chas. Voysey, and Mr. Herbert B. M. Praed. Also Miss Jane E. Cobden (daughter of Richard Cobden), Miss Richardson, M.L.S.B., Miss Edith Simcox, M.L.S.B., Miss Anna Swanwick, and Miss E. Orme.

In introducing the deputation, Lord Dunraven said:—My lords and gentlemen, as president of the Sunday Society the duty devolves on me of asking you to receive the deputation, who wish you to permit them to present a memorial begging you to throw open this museum on Sundays. The object of this society is to allow museums, art-galleries, libraries, and gardens to be opened on Sundays, and we think that if our object could be fully attained it would confer great benefit on society at large, and particularly on those who, on account of their ordinary work, are unable to visit places of the kind except on Sunday. We think it would be beneficial to these people on moral, social, and religious grounds, and we think it would be far better they should spend their Sunday in that way rather than in absolute idleness. We think it better also on grounds arrived at from experience, because, as you are aware, there are many museums, libraries, &c., open on Sundays, in various towns in the provinces and in the suburbs and neighbourhood of London; and these are visited by many thousands of people. No complaints have arisen, no scandals have arisen, and the opposition that there was previous to the Sunday opening has entirely disappeared, owing to the good results which have been seen. In seeking amusement in such places as the British Museum, it is impossible, at the same time, not to derive instruction, and it seems to me that the present year would be very suitable for a first opening of this museum on Sundays. This year is the centenary of the institution of Sunday Schools, which have been of such great benefit to children, and I think this would be a peculiarly good opportunity of giving the same advantages to grown-up children. We attach particular importance to the British Museum, because we think there is a certain amount of hardship in the fact that many of us cannot visit this building on week-days, and are thus unable to enjoy an institution which belongs to the nation. If it could be opened even as an experiment it would be of great value, as it would enable the trustees to judge of the way in which it would work. If it should be a question of estimates which stood at all in the way, it might be possible to open the Museum for a few consecutive Sundays, closing it on one day in the week in order to see whether a plan of that kind would succeed. With these few remarks, I will ask you to allow Mr. Judge, the honorary secretary, to read the memorial; and I will ask you, then, to hear a word or two in its support from Sir Arthur Hobhouse, Professor Flower, and Mr. Geo. Godwin.

Mr. Mark H. Judge then read the memorial as follows:—

*"To the Right Honourable and Honourable the Trustees of the British Museum.*

The memorial of the President and other officers of the Sunday Society

Sheweth:—That your memorialists consider that the acknowledged success which has attended the Sunday opening of various museums, art galleries, libraries, and gardens, both under Imperial and under municipal regulations, and the absence of the slightest agitation to again close them on Sundays, fully justifies your memorialists in asking you to exercise your prerogative in the interest of a large section of society, and open the British Museum on Sundays.

The success referred to has recently led statesmen to declare it to be their conviction that before long the object of the Sunday Society will be attained, and your memorialists anticipate that the Legislature will at an early date see its way to open the whole of the national museums and art-galleries on Sundays.

Your memorialists, however, cannot but recognise the difficulties which stand in the way of this important matter being properly dealt with during the present brief session, either in Parliament or by the Government; and pending the further action of the Legislature, are of opinion that it would be a graceful act were you to at once open the British Museum on Sundays, and an act that would be highly appreciated by all classes of the community.

On behalf, therefore, of the fifth public annual meeting of the Sunday Society, held at the Freemasons' Hall on the 29th of May, 1880, your memorialists respectfully ask you to open the British Museum on Sundays for the convenience of the public during such hours and under such regulations as you may deem necessary.

DUNRAVEN, President.
W. H. CORFIELD, Chairman of Committee.
FREDERICK LONG, Treasurer.
Mark H. JUDGE, Honorary Secretary.

July 10th, 1880."

Lord Dunraven, having formally presented the memorial to the trustees,

Sir Arthur Hobhouse said,—The matter is not

one that concerns the working-classes alone, but other classes, which, if not very large, are still worthy of consideration. For the sake of these the museums should be opened on Sundays, unless there is some official or substantial reason to prevent it. If there is such a reason it is not known to me, and in any case there should be a way to overcome it. I believe that you will confer a great boon upon a great body of persons by acceding to the request of the memorial.

Professor Flower said,—One of the principal arguments that have been used against us is that if museums were opened it would tend to further what is called the desecration of Sunday. I have no such fear myself, and I value our English Sunday as much as any member of the community. It is one of the objects of this society to preserve the English Sunday by having a portion of it set apart for recreation of this kind. I myself enjoy part of the Sunday afternoon at the Zoological Gardens, and if I have been at church in the morning it is perhaps all the better. I do not see why other people should not be able to do the same thing.

Mr. George Godwin said,—I have a strong impression that no amount of mere speech-making will alter the opinions already formed by the trustees, and will therefore confine myself to a piece of evidence, with the preliminary observation that the trustees will probably attach importance to the fact that this deputation, numbering more than a hundred persons who may be considered to a certain extent representative, has been gathered together in forty-eight hours, showing the strong interest felt in the subject by many. The first thing, then, I will say is this, in answer to some who urge that if the Museum were opened as desired the working men and women of London would not take advantage of it. It happens to me that for many years I have been in communication with large numbers of the working-classes throughout the kingdom, and I can assert from my own personal knowledge that they do greatly desire, especially the younger and rising men, the opportunity of visiting museums and galleries on their leisure day. Further I can say, as a member of the Council of the Royal Albert Hall, that the free Sunday organ recitals there, consisting of music of the highest possible character, have been attended Sunday after Sunday by constantly increasing audiences numbering on each occasion from 4,000 to 5,000 persons, thus giving elevating enjoyment to large numbers of persons. It has afforded those who think with me great satisfaction to learn that the leading officials of this institution are favourable on their own part to it being opened on Sunday, and I do hope you will grant our request, if only by giving one Sunday this season. It will only be ante-dating the matter, because that this advantage will be afforded sooner or later everybody is satisfied.

Earl Sydney, in replying to the deputation on behalf of the trustees, said:—Lord Dunraven, Ladies, and Gentlemen,—The trustees of the Museum do not give any opinion upon the great Sunday question, nor do they bring forward their own individual opinions upon the merits of opening the Museum as requested on Sundays. I have only to say to you on their part that it is impossible to open this Museum without communicating with the Treasury with regard to the expense of it.

Lord Dunraven said,—Perhaps you will, before we retire, allow me to give you a list of the names of those who are present; you will also, I hope, allow me, on the part of the Society, to thank you for receiving the deputation and accepting the memorial. We hope that before long steps will be taken to put an end to the difficulty which you mention as standing in the way of our wishes being acceded to.

The deputation then withdrew.

Among those who wrote expressing their great regret at being unable to accompany the deputation were the Duke of Westminster, Viscount Powerscourt, Lord Truro, Mr. P. A. Taylor, M.P., Hon. J. C. Dundas, M.P., Mr. Alex. Macdonald, M.P., the Dean of Westminster, Canon Shuttleworth, Rev. A. H. Mackonochie, Sir Henry Thompson, Sir Julius Benedict, Professor Williamson, F.R.S., Professor Max Müller, James Heywood, F.R.S., Mr. Moncure D. Conway, M.A., and Professor Huxley, F.R.S.

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**Scarborough Spa.**—The new Spa buildings at Scarborough will be opened on Monday, the 2nd of August.

## PARLIAMENTARY JOTTINGS.

*The Westminster Clock.*—In the House of Commons, on the 8th inst., Mr. Adam (in answer to Mr. Forester) said,—The cost of executing the necessary repairs, painting and regilding the west face of the clock, the ironwork surrounding it, repairing the hands of the clock, the metal framework, and the opal glass, has been about 240*l.* These repairs are of a dangerous nature, and can only be undertaken during the summer months. A special scaffolding had to be designed and completed, and I cannot say that, considering the difficulty of the work, it has taken an unreasonable time to complete.

*Cemeteries at Wandsworth.*—Sir H. Peek asked the Secretary of State for the Home Department whether he was aware that the proposal of the Battersea Burial Board to purchase nearly 40 acres of land near Wandsworth Common, in the parish of Wandsworth, had caused great consternation among the ratepayers, inasmuch as there were already seven cemeteries in or close to Wandsworth, and one on the borders of that parish for Battersea; that the establishment of another cemetery for a thickly-populated parish would not only be prejudicial to a large amount of rateable property, but also in contravention to the intention of the Burial Acts; whether he had been informed that the matter was strongly opposed by the ratepayers of Battersea on account of the large price to be paid for the land; if it were known that the land in question had a subsoil of clay; and if he would be so good as to cause immediate and full inquiries to be made into the subject.—Sir W. Harcourt replied that, in consequence of the report on the subject which had been made to him, the site for the cemetery in question would not be approved.

*The Royal Academy.*—On the 9th inst., Mr. Thompson asked the First Lord of the Treasury if the Government would use its influence with the President of the Royal Academy to open its exhibition free of charge on Monday, the 2nd of August, being Bank Holiday. In reply, Mr. Gladstone said it was not usual for the Government to interfere in any manner in the administration of the details of the Royal Academy. At the same time, he had every reason to believe in the disposition of the President and the Council of the Royal Academy to give accommodation to the public and to entertain any reasonable proposal; and without giving an opinion,—which would not be in accordance with his duty,—on this proposal, he would recommend that the gentlemen interested in it should seek an opportunity of meeting, on public grounds, the President of the Council. He had no doubt any representations made would be kindly and respectfully and carefully entertained.

*Public Offices.*—In the House of Lords, on the same evening, Lord Lamington asked Her Majesty's Government whether during the recess they would consider the report of the House of Commons Select Committee of 1877 on Public Offices, with the view of the improvement of the public offices, inasmuch as the committee were all but unanimous in insisting on the necessity of immediate action, not only on economical considerations, but for the efficiency and comfort of the public departments. The committee reported three years ago, but nothing had yet been done. Their public offices were most inconveniently scattered about the metropolis. Sixty or seventy different houses or apartments in different houses, all separate from each other, constituted the War Department, and the mere hire of such imperfect accommodation cost about 60,000*l.* or 70,000*l.* a year. Such a sum as that would go far towards repaying the outlay of a million and a half which the erection of adequate buildings would entail. Lord Sudely, on behalf of the Government, said the subject was one which would not be lost sight of when the funds of the country would enable the Government to consider the question. In the course of the discussion which followed, Viscount Cranbrook said he thought there was some exaggeration in the statements about the ill-health of the persons employed in the War Office. The condition of that office was not much worse than that of some of the new offices. In the India Office there were places lighted up in the daytime with gas, and papers were read by the aid of a sunlight in the centre of a room on a day in June when the sun was at its height. If offices were to be built on that principle, it would be better to put up with bad offices.—The Earl of Redesdale trusted that the Government would, without delay, acquire the freehold of the land lying between Parliament-street and Great George-street, not necessarily with a view to immediately building upon it, but to obtain possession of it while yet it might be purchased at a moderate price.

*The Tay Bridge.*—In the House of Commons, on the 8th inst., on the second reading being moved of the Bill of the North British Railway Company for the rebuilding of the Tay Bridge, Mr. Anderson opposed it, and, adverting to the condemnation passed on Sir T. Bouch in Mr. Rothery's report, strongly objected to that gentleman being employed in the reconstruction of the bridge. Mr. Chamberlain, in the course of his reply, said that Sir T. Bouch would have nothing to do with the plans, and explained that he proposed to refer the Bill to a hybrid committee, with instructions which would widen the scope of the ordinary inquiry. After some further converation, the Bill was read a second time and ordered to be referred to a hybrid committee, with power to inquire into the best position for the bridge, the protection of the navigation, the best mode of securing its permanent safety, &c.——On the 12th inst., Sir A. Gordon asked whether the position and the construction of the piers of the bridge and the width and the height of the spans, as they were altered from the deposited plans approved by Parliament, were such as were prescribed by the Board of Trade, and whether a copy of the document giving its sanction could be laid on the table. Mr. Chamberlain.—The bridge over the River Tay, as originally designed, had spans of 200 ft. of clear water space over that part of it which fell, and 100 ft. headway. As prescribed by the Board of Trade, the spans were still to have been of 200 ft., but the headway was reduced to 88 ft. But, as actually constructed, there were eleven openings of 245 ft. span and two openings of 227 ft. span, with 88 ft. headway. Therefore, the position and construction of the piers of the bridge, and the width of the span for openings betwen the piers were not such as were prescribed by the Board of Trade according to the provisions of the 6th clause of the Act 33 & 34 Vic., chap. 135, which authorised the construction of the bridge. The company did not inform the Board of Trade of the alteration which they had made, and the Board of Trade were not aware of it until some time after it had been effected. The width of the spans was settled by the Board of Trade merely with regard to the interests of navigation of the river; and as the increase was an improvement, the Board of Trade saw no reason to object to the alteration. The sanction of the Board of Trade to the alteration authorised by the Act was given on the usual printed form, and was accompanied by a signed plan. The plan is of great size and length, and I hardly think it would be worth while printing it, but if the hon. baronet wishes to inspect the documents, I shall be most happy to show them to him at the Board of Trade. Sir G. Campbell asked what course the Government proposed to adopt in consequence of the report of the Wreck Commissioner regarding the fall of the Tay Bridge. Mr. Chamberlain.—As soon as I received the reports of the Courts of Inquiry with regard to the Tay Bridge, I directed a circular letter to be sent to all the railway companies, enclosing a copy of the reports, and calling their attention to the grave responsibilities which they incurred with regard to all structures of a similar nature on their lines of railway. That circular I will lay upon the table of the House. I also desired a copy of the reports to be sent to Major-General Hutchinson, and called upon him for an explanation with regard to the remarks contained therein as to his original inspection of the bridge. General Hutchinson's memorandum I will also lay upon the table. It is also my intention to appoint a committee to consider what rules it may be desirable to make with regard to wind-pressure upon railway structures, as suggested in the report of the court of inquiry.

*The Canal Boats Act.*—On the 12th inst. Mr. J. Cowen asked the President of the Local Government Board whether it was the intention of the Government to take any steps towards the better enforcement of the Canal Boats Act of 1877, so far as it related to the overcrowding in the cabins and the education of the canal-boat children; and whether the Government intended taking any steps for bringing temporary abodes, such as gipsy tents, vans, shows, and like places, under the influence of the sanitary officers, and the children dwelling in

those places under the power of the Education Acts, in extension of the provisions of the Canal Boats Act of 1877. Mr. Dodson.—The Local Government Board have made regulations for preventing overcrowding on these boats, and it rests with the local authorities to see that these regulations are observed, and also the provisions of the Act with regard to the education of the children. The Board have no power to compel the local authorities to enforce the Act, and as they are not aware that any further compulsory power is required for that purpose, the Government themselves have no intention at present of proposing further legislation on the subject. There is considerable difficulty in dealing with gipsies' tents, &c., but the matter has been brought under the notice of the Board, who will endeavour to deal with it when a suitable opportunity presents itself for that purpose.

*The Census Bill.*—On the 12th inst. Lord Enfield laid upon the table of the House of Lords a Bill to provide for the decennial Census of 1881. He explained that its provisions were almost identical with those of the Act which provided for the Census of 1871, with the exception that the Local Government Board was constituted the central authority, instead of the Secretary of State for the Home Department. This was necessary in consequence of the passing of the Local Government Board Act in 1871, which, in conformity with the recommendations of the Royal Sanitary Commission, transferred to the Local Government Board such jurisdiction as the Home Office previously possessed over the Registrar-General's Department. The Local Government Board would therefore superintend the taking of the new Census, and approve all the forms and instructions to be issued for that purpose. The work, however, would, as on former occasions, be done in the Registrar-General's Department. The persons employed outside that department would be the various superintendent registrars, the local registrars, and the several enumerators to be appointed by them, and the overseers of parishes, constables, and relieving officers would be bound to act as enumerators. The Census would be taken on the night of Sunday, the 3rd of April, 1881. Clause 4 of the Bill provided for the particulars to be returned by each householder, and they were classed under the following eight heads:—1, name; 2, sex; 3, age; 4, rank, profession, or occupation; 5, condition as to marriage; 6, relation to head of family; 7, where born; 8, whether blind, deaf or dumb, imbecile, idiot, or lunatic. On Monday, the 4th of April, the returns would be collected by the enumerators, and corrected when erroneous. The enumerators would take the account of the occupied and unoccupied houses, and houses then building, and distinguish the boundaries of parishes and boroughs. They would deliver their books, with the householders' schedules, to the registrars, who would verify the same and hand them to the superintendent registrars. These would examine the books and return them to the Registrar-General, who would cause the returns to be abstracted, and a preliminary report would be laid before Parliament before the 1st of June in the following year. The Census in detail would be completed as soon as practicable afterwards. ——Earl Fortescue regretted to find that no provision was made for the completion of the Census in less than two years and eleven months. He suggested that a large local staff should be employed, so as to finish the work within something like three months. The cost in the end would not be greater, and it was important to have the information as nearly as possible up to date. The Bill was read a first time.

## TWO EXHIBITIONS WORTH SEEING.

A FORTNIGHT ago we briefly chronicled the opening of an "Industrial and Fine Art Exhibition" in the large hall of the Bow and Bromley Institute, over the Bow Station of the North London Railway. The best things among the workmen's exhibits are by those who show specimens of their own handicraft. Among the most notable exhibits in Class II., "Artistic work in terra cotta, stone," &c., are some small figures, a carved panel, and a portion of ceiling decoration, exhibited by W. Allan, carver, Lambeth (No. 106 in catalogue); plaster bas-reliefs (No. 110), modelled by C. Bursill, stone-carver, Westminster Bridge-road; and two vases and two salad-bowls (113), exhibited by Edward Dunn, draughtsman and designer to Messrs. Stiff & Sons, of Lambeth;—these four articles are in stoneware, and in general design and treatment resemble the now well-known Doulton ware, though they hardly attain its excellence. Mr. H. Gunthorp, stone-carver, Herne-hill, exhibits (117) specimens of his skill in modelling in the shape of a figure from the antique, and a small medallion. Mr. J. Gwillim, smith, Stamford-street, exhibits (118) a wrought-iron ornamental bracket and a *repoussé* medallion of Garibaldi, in copper. A well-executed silver dish in *repoussé* work (124), exhibited by W. Middleton, embosser, Liverpool-road, Islington, is labelled as purchased by Mr. Hubert Herkomer, A.R.A., one of the judges in the Artistic section. The exhibition contains some good mechanical models and other work by engineers, also several large models of steamships built for the navy and mercantile marine by Messrs. Samuda Brothers and other well-known firms, by whom the models have been lent. There is also some excellent coopers' work, the Coopers' Company having offered a special prize to workmen in this trade. Mr. Wilberforce Bryant lends a collection of Japanese curiosities and manufactures; Messrs. Doulton & Co. send a good representative collection of their artistic Doulton ware and Lambeth faïence; Messrs. Powell, of Whitefriars, have an excellent display of glass; and Messrs. Josiah Wedgwood & Sons are represented by a case of ornamental Wedgwood ware. The exhibition, like all its congeners, contains the usual heterogeneous collection of articles produced, with infinite pains and labour, by people who are evidently quite unaware of their lack of aptitude for the particular work which they impose upon themselves in their leisure hours. To cite only one instance. The exhibit marked No. 135 in the catalogue is described as an open-work vase, cut in Caen stone, and is the work of Mr. A. Tilley, painter, plumber, &c., Rotherhithe. The exhibitor may be an excellent workman in his own particular trade, but in laboriously producing this vase he has shown himself to be quite unable to appreciate the nature of such a material as Caen stone, for in it he has, with an amount of patience and perseverance which could have been far more usefully applied in other directions, produced a perforated vase of delicate fret-work, from his own design,—a design utterly unsuited to the material in which it has been executed. The difficulties which the producer had to contend with are testified to by the numerous joints to be seen in the work where breakages have occurred. The hall in which the exhibition is held is admirably adapted to the purpose, and the general effect is greatly enhanced by the stained-glass windows exhibited by Mr. Thomas Cox, of Southampton-row, Russell-square, who also displays on the staircase a number of cartoons and drawings for stained glass and church decorations generally. In the hall the same exhibitor has a good show of painted tiles and other ceramics. In this brief glance at the exhibition (which will remain open until the end of the present month, and perhaps longer) we have said enough to show that it is well worth a visit.

The Printing, Stationery, Paper-making, and Kindred Trades Exhibition and Market, at the Agricultural Hall, is eminently deserving of a visit from all who take any interest in the production of books and newspapers. Machinery of the most varied character is to be seen in motion, and appliances and materials of all kinds used by printers, bookbinders, lithographers, and engravers, are fully represented. Among the motors now largely used by printers, as well as by other users of power, we noticed, during a hurried survey of the exhibition, the well-tried "Otto" silent gas engine, and Bailey's hot-air engine, some particulars of which we lately published. The catalogue, sold for sixpence, is well arranged, and as it contains well-written articles on "The Origin and Progress of Printing," by John Southward, and on "Paper and Stationery," by W. F. Catcheside,—each containing a fund of information,—it is worth preserving. An interesting set of *fac-simile* reprints is exhibited by Mr. Elliot Stock, as specimens of the reproduction of ancient books by modern appliances. They are to be found among the cases of exhibits sent by Messrs. Field and Tuer. The exhibition, which appears to have been a great success, closes this Saturday, the 17th. All who can manage to visit it in the short interval that remains will find themselves well repaid for their trouble.

## AS TO THE SANITARY INSPECTION OF DWELLINGS.

IN the course of the recent Conference at the Society of Arts on the progress of public health, Mr. Cresswell opened a discussion on the following resolution, under the head Sanitary Inspection and Classification of Dwellings:—"That it is expedient that the Metropolitan Board of Works within the metropolis, and the County Board within each county, should be empowered by the Legislature to make provision for the inspection and sanitary classification of dwellings, upon application being made by the owners thereof; and to grant certificates of healthworthiness in different categories, for terms of years, according to the perfection of sanitary equipment and fitness for habitation of such dwellings; and to determine the scale of fees to be paid for such inspection during construction and repair, and also upon delivery to the applicant of the certificate of classification awarded to such dwelling."

After urging the necessity of such a measure, Mr. Cresswell said, in conclusion,—They would see the importance of handing over these duties to such public body or bodies as would command undivided confidence; that there should be no possibility of collusion between builder or contractor, engineer or sanitary expert, employed by the association or public body; that there should be no doubt whatever that the same repute should attach to the certificate issued from this public body as attached to a certificate of Lloyd's; and he could not put the case stronger than that; for, at that moment, the well-known "Lloyd's Register," bound in blue and gold, bearing the certificate of their secretary, was accepted throughout the whole civilised world as an indisputable evidence of the truth of that which it contained. Some of them might live to see,—they, no doubt, all hoped to live to see,—the time when there should be such a book in the hands of every municipal authority throughout England,—in the register or in the archives of every local sanitary authority in the kingdom; and, above all, in the archives or secretariat of the metropolitan authority,—whatever it might be in the future,—which was destined to govern this great City. If that were so, they would have palpable and tangible evidence of the fact, the means of ascertaining whether the houses in which they had to dwell were fit for human habitation. In the case of the metropolis, whatever the metropolitan authority might be, it should be charged with this most important function; and as they all hoped to see within a few months' time the institution of County Boards throughout the kingdom, no better authorities could be found,—as they were above suspicion,—to perform a similar function in the counties. That was, in fact, the substance of the proposition he had now the honour to lay before the Conference. He submitted with confidence that it was at least worthy of the society under whose hospitable roof they were, and worthy of their attentive consideration.

A long discussion followed, and we give the opinions expressed by some of the speakers.

Dr. Wright said, as representing a town peculiar in its character, namely, Cheltenham, to which a great number of particularly timid and nervous people came to take up their abode for the purposes of health, it was astonishing how nervous these people were on this particular question of the condition of house property. He had letters, some even from India, making inquiries about certain places. Of course, as an officer of health, he could not interfere with the rights of private property. He could not say all he knew about houses; but he gave those individuals references to a sanitary engineer, to whom they could apply, and who would make an inspection of the houses. That had been going on for some time, and, of course, sometimes the reports were unfavourable, and there was a threatened action for damages against the man who had spoken the truth. But altogether it appeared to him that what Mr. Cresswell had so well put before the Conference was neither more nor less than the outcome of what had been going on of late years with reference to sanitary progress. They had awakened the attention of the public mind, by trying to teach them the alphabet of sanitary science, and they were now beginning to spell out the words for themselves. Now came home to every one the important question,—Is the house I am about to take healthy or otherwise? But when the inquiry was made, there was great difficulty

arriving at a conclusion. Very often the most intelligent persons had suggested the want of the very resolution which Mr. Cresswell had so ably introduced, and which he should be very glad to propose be adopted by the Conference.

Dr. Tripe pointed out the difference between ships and houses, especially as regards the sanitary condition and fitness for habitation of such dwellings, which were so great that, to certify for a term of years that the house would be fit for occupation was certainly ill-advised. If the words "for a term of years" were omitted, he should have comparatively little objection to it. Those who knew much of sanitary work were aware that the leaden pipes leading from the water-closets got eaten through; holes were made in them, and it could not be told from the quality of the lead how long they would last. They did not know the reason why certain pipes should be eaten away, and others remain whole. It was, therefore, impossible to give a certificate to the effect that the house would be in good condition for a certain number of years. As to a house being put in the first, second, or third classes, and certified accordingly, he could understand that. He had seen a great deal of building, and gave evidence before the House of Commons on bad building. He had analysed a large number of samples of mortar used, and had found mortar, even recently, made with only 10 per cent. of lime, the greater part of the rest being,—he would not say rubbish,—after Mr. Cresswell's definition of the word,—but garden mould, or something no better, and the consequence was the houses fell down. The inspection of these things was entrusted to officials appointed by the Metropolitan Board of Works, and it was now proposed to appoint others. Were they to have one set of men appointed by the same authority to supervise the others? He could not agree to that; you must find some other body. The surveyors appointed by the vestries had to superintend the drains, and the district surveyors appointed by the Metropolitan Board of Works had to do with the walls, the damp-proof course, the foundations, the roof, and other things of that kind. The water-closet arrangements, and all works connected with drainage, are, in the metropolis, under the control of the vestries and district boards. It was said that no vestry or district board had any regulations, but he would hand in some, framed by the Hackney Board, showing that one board, at any rate, had regulations concerning matters of drainage. There was plenty of power, in fact, both as regards district surveyors and surveyors to local boards, to prevent bad work. They could require anything reasonable to be done, as the bye-laws of the Metropolitan Board were extremely full if they were properly carried out. For what reason should there be any addition to these, or why should a person have, perhaps, to pay again the officer who was already paid, to see that things were properly done at first? As he had already said, he had analysed mortar containing only 10 per cent. of lime, which, when put into the crucible, turned red from the quantity of clay it contained. That was not in accordance with the bye-laws of the Metropolitan Board. He had ascertained the quantity of organic matter in it, and, when mortar was made containing organic matter, it gave off a smell sometimes for six months. That caused a gradual crumbling; so that, although apparently good and setting well, it would by keeping, even in a dry room, in the course of time become perfectly rotten. This kind of mortar is used to a considerable extent by "Jerry" builders. He quite agreed it was most important that persons wanting good dwellings should be able to know where to get them; but here was the difficulty, that persons must be engaged *ab initio*, or they could not tell what was underneath the house, and whether the drains were put in in concrete or not. In Hackney, every drain going under a house within 3 ft. of the floor was to be in concrete, and every drain was supposed to be examined, two men being appointed for the purpose; but, of course, he did not know that they did so, as they were not under his control. He believed that every house, so far as the drainage was concerned, was examined; but he could not say what was done with the walls and foundations, and everything of that kind. These you could see afterwards, but as for the drainage, and what was buried under the ground, you could not see without considerable cost and trouble. Therefore, in order to carry out this proposal, there might be something done by calling the attention of Vestries and Boards to the fact that they had full power to make bye-laws,—which very few had done,—and to insist that they were carried out; that no drain should be covered over without the surveyor or his representative seeing every portion of them, and that every drain under a house was laid in concrete.

Lord Alfred Churchill said the condition of people's dwellings really lay at the root of the question of public health. He should be glad himself, as soon as such a thing became law, to have his house inspected, and to get a certificate upon it. Four or five years ago he had the drains put in order, and should have been glad then to have got a certificate that they were so. Whilst the work was in progress he casually met the inspector of the district, who told him he had watched the laying of the drains, and he said he was very glad they made such a rule that the drains were not to be closed in until they had been inspected. The inspector said, although they did in this case, they were not in the habit of doing it to everybody. Now, he thought it was absolutely necessary that it should be done in the case of every house. He thought the health-worthiness of a house depended almost entirely on the system of drainage, and the certificate should be that the house was examined at such a date, the drains were laid according to the most scientific methods known at the date, and calculated to last such a time; not giving any certificate of health-worthiness, because that was the natural result of good drainage. He would suggest that the certificate should be in the form that the drains themselves were constructed in a proper manner, and were calculated to last so many years. He thought there should be attached to each certificate a complete drawing of the way in which the drains were constructed, in the same way as an outline of the property was generally shown on the deed of conveyance.

Mr. Collins asked if the army of inspectors necessary to carry out this suggested work of inspection had been considered. He had for many years taken a great interest in these questions, and was on many committees in the parish of Paddington, which is a very large and wealthy portion of the metropolis. As had before been mentioned, he considered the Metropolis Local Management Act gave all the power necessary to enable vestries to see all that Mr. Cresswell wished carried into effect; but, whenever you brought such matters forward a storm was at once raised as to the large amount of money it would cost, and the incubus it would be on the ratepayers in order to get such a system carried out. If it were self-supporting,—if the public were so alive to the question as was hinted,—there was nothing at all to prevent them obtaining, without the aid of the Society of Arts, without the assistance of Government, or any similar means, such certificates as were referred to. There were many gentlemen, eminent in their profession, quite capable of giving such a certificate. The truth was that, like most permissive legislation, it would be simply a dead letter if it were passed. There were very few people who, like Earl Spencer, could afford to go to the large expense which such a system demanded. He could only say, from his own experience as a sanitary architect and engineer, that he had always found that when mischief was discovered,—as during the prevalence of fever,—everybody was anxious to do all that was requisite with regard to sanitary improvement; but the moment the epidemic passed away, there was great apathy, and very little was carried out. This question was by no means new. At the meeting of the Social Science Association held at Brighton (to the Health Department of which he had the honour of being secretary) this subject was fully discussed, and the result of it was, a large number of circulars were sent round to the different seaports and towns, for the purpose of ascertaining how the authorities would fall in with views very similar to these. He believed 400 or 500 circulars were sent, and about twenty or thirty replies only were received, showing how great was the anxiety on the part of the public to carry out such a suggestion. In Edinburgh, Manchester, and Glasgow companies had been formed for the purpose of giving such certificates, but he did not think they had been in existence more than one or two years, and therefore it would be difficult to say practically how far they had succeeded; but he should like to know what dividends they were paying, and how far the sanitary rules laid down in this resolution were found beneficial. He thought it would have very little effect indeed. If a man really wanted his house put in proper order and condition, there was no difficulty in obtaining such a certificate; and if the Conference wanted to throw the onus on local authorities, he was perfectly certain they would not carry it out, even if it were paid for. He should like to say a word in defence of his own profession, as a district surveyor for an important part of the City of London. The Act of Parliament gave no option to the district surveyor (until very recently) to attend to sanitary regulations as connected with the building operations in the metropolis. His duties were to ascertain that the walls were built of sufficient thickness, and that certain precautions were taken with regard to accident by fire. Recently, and after an enormous amount of opposition, the Act having been passed two years, certain bye-laws had come into operation which were very simple indeed, and which, by and by, people would be astonished to find had taken so lengthened a period to adopt; but these simply provided that there should be damp-proof courses and proper foundations to the houses; and therein all the sanitary bye-laws of the Board of Works began and ended. A great many more were prepared, but there were so many objections raised, and selfish interests alarmed, that the whole thing threatened to collapse, and they only succeeded in carrying what he had referred to. They did get, it was true, a definition of mortar, but it still only remained a definition, as far as his experience went. There was the greatest possible difficulty in obtaining these "Jerry" builders to perform their work properly. Even if this duty of giving certificates were placed in the hands of inspectors of health, or vestries, or local boards, from his knowledge of the subject, he thought there would always be a certain amount of suspicion attaching to them. The only way of carrying these views into practical effect was to get the public mind sufficiently educated to the necessity of seeing that their houses were fit to live in, and not to die in; and then they would take proper means of availing themselves of such professional assistance as was open to them, in order to insure that their houses possessed those healthy conditions which they desired.

Mr. Wakefield was entirely in favour of this proposition. It had been in his mind many years, and there was no way of getting the public to adopt sanitary measures, except by making it a question of self-interest. You could not do it in any other way but by a system of certificate; but the question appeared to be surrounded by some difficulty. It would be almost too onerous a duty to impose upon local functionaries. The task would be so invidious if called upon to withhold a certificate, the withholding of which would be to inflict a serious injury on the proprietor, that there would be such an amount of pressure brought to bear on the officers as would be hardly fair to subject them to. He could not see his way out of it, except by having a special officer appointed by the Local Government Board in London, and even an officer of that kind ought to be bound down by the most stringent rules. It was not only the drains, but the walls that were of importance. It was impossible to have a good house if you had lath and plaster in it at all, and all the walls should be able to bear a certain amount of surface-pressure without yielding. If a system of that kind could be carried out, the value to the public in general would be incalculable. Take a case for instance; he knew a first-class school where the children of noblemen were being educated where typhoid fever broke out again and again. Nothing wrong could be discovered in the sewers; but on examining the walls it was found that forty papers had been pasted one upon the top of another, and, in fact, two large wagon-loads of old paper were taken away. Lodging-houses and hotels, again, of superior character, would be very glad to use this system as a means of attracting visitors.

Mr. Lovegrove thought it expedient, if practicable, to have certificates such as were referred to in this resolution, but the question was surrounded with difficulties. He had no faith whatever in any certificate, whether it had blue or red ribbon upon it, whether a gilt edge or not. What was wanted was more thorough supervision during the progress of the works, for there were miles of drains which appeared on the face of them perfectly sound, but which

possessed qualities of unsoundness which might prove, after ordinary inspection, a great injury to the inhabitants. They wanted, if they could, to get hold of the hand from which they could obtain sound workmanship, for we depend more on the hand that works than upon occasional overlooking. They wanted drains laid by educated workmen. In the Hackney district, the Local Board executed the work outside, from the sewer to the area, under contract, but from that point underneath the houses throughout to the back, the work was executed usually by the builders. Sometimes there were as many as five or six different workmen engaged on that section of the drain, and the time over which the work extended would be from one month to seven or eight. There we have one of the most serious difficulties in superintending the construction. In order to ensure perfect construction of the drain, the whole of the work, from the sewer to every inlet, should be executed by one, and a properly-constituted authority, and not left to the builders. He had on former occasions referred to the question of certified workmen, and he thought if they could have a class of workmen educated to do this particular work, it would be a step in the right direction. In the absence of that, he should suggest that the whole of the work should be executed by the local authorities at the cost of the owner, but he should object to the Metropolitan Board of Works being entrusted with the power of surveying the work done under the local authorities.

Captain Galton thought it would be very undesirable to pass any resolution which would not be of a practical nature. Although he entirely sympathised with Mr. Cresswell as to the desirability of adopting some means for securing that houses should be constructed in a manner which should insure their healthiness, he had very grave doubt as to how far this mode of effecting that object was practicable. It went to the extent not merely of the drains, but of the whole sanitary character of the houses; it included the nature of the materials, the walls, the ventilation, and the mode of construction of the basement, the means of saying that the house was not being built upon a foundation which was in itself injurious to health, as the foundations of so many houses in London were. All these were points which, if you were to have a certificate of healthiness of the dwelling, must be examined into by the authority which was to deal with it. It seemed to him it would be far wiser to pass a resolution similar to what, no doubt, had been passed before, that all plans of drains, and the sanitary appliances of all dwellings, as well as all alterations in such matters, should be registered at the office of the district surveyor or vestry, and that any person wishing to take a house should be able to examine this plan. The fact was that the arguments which had been adduced on this subject pointed really to the necessity of an improved education of the whole nation in sanitary matters; it was that only which would insure a healthy construction of houses.

Mr. Rogers Field entirely concurred with Captain Galton. He though the resolution, as it stood, could not possibly work. It referred to certificates for old houses as well as new houses; but he was quite certain that certificates could not be given for old houses. The amount of investigation which would be required, if the certificate was to be worth anything, would be enormous, because, in an old house, you must examine everything, open everything, and search everything; if you did not, you would be certain to miss something which was very faulty. With new houses it was different, but then they came to what Dr. Richardson had said: you wanted, first of all, a standard to work by; and, at the present moment, they had not got that in the metropolis. You might go with a scheme of sanitary arrangements for a house, proposing what every man who had studied the subject would agree was the right system, but the vestry would very likely think differently. The question of cutting off the house from the sewer by a ventilated trap, or manhole, was most important from a sanitary point of view; but, when he proposed to do that, one of the West-end London vestries said "No," and raised all sorts of difficulties. Until this state of things was remedied with the vestries, it was impossible to go any further. If proper bye-laws for house drainage were introduced, you might have a certificate saying that the bye-laws were complied with; but, unless it were done in that way, you would get into difficulties.

The Chairman said he had made some verbal alterations in the resolution, which he thought would improve it, and it would now read as follows:—"That it is expedient that the local authorities should be empowered by the Legislature to make provision for the inspection of dwellings on a defined system, upon application being made by the owners thereof; and to grant certificates, according to the perfection of sanitary equipment and fitness for habitation of such dwellings, accompanied by plans of drains, closets, and gullies, &c.; and to determine the scale of fees to be paid for such inspection during construction and repair or otherwise, and also upon delivery to the applicant of the certificate awarded to such dwelling."

Mr. Smallpeice, C.E., said nothing had been observed as to the men who were to be appointed inspectors, and what qualifications they should possess for their office. The Public Health Act gave power to urban and rural sanitary authorities to make bye-laws containing every provision required in this proposition. It empowered them to appoint inspectors or surveyors to see that those laws and bye-laws were carried out, but there was no qualification required for those surveyors. He had a letter some time ago from Sir John Lambert, stating that there was no qualification required by the Local Government Board for a country surveyor, any more than the guardians might require. In London, every district surveyor had to undergo a special examination, and show that he was fitted, before he could obtain the office, but in the country any person who could get a majority of the guardians was appointed. Now, it was evident that a certificate would be valueless unless the surveyor had undergone some examination as to his qualification to perform his duties.

Mr. Pearce thought this resolution was not calculated to remedy the evils complained of, yet it was likely to be operative to a considerable extent in deterring builders from putting such bad workmanship and materials into houses as they had been in the habit of doing; therefore, apart from the benefit which would accrue to those who might be fortunate to live in a house certified to be healthy, its indirect influence would be very great in removing many of the evils from which they had at present suffered. Some houses which were condemned as being absolutely unhealthy had been constructed under inspection, both as to materials and workmanship employed; it should be made more of reality. He spoke on behalf of house-occupiers and owners, and thought it would be lamentable to have to leave this question until the public generally were educated in sanitary science. As a rule house-occupiers could not give much attention to this matter. Houses were largely built by speculative builders, who were merely anxious to get them them up, certified to be habitable, and sell them, and the public looked to the authorities to protect them against these evils.

The Chairman said he was sometimes told by his friends that he had something of the judicial element in him, that he did not go to extremes; but, upon this subject, he went further than the resolution. He supported the resolution, because he agreed with Dr. Bond that it was a good tentative educational way of going to work. It pointed out the functions and duties of local sanitary authorities, and the obligation they had undertaken with regard to the ratepayers of the district who support them, and whose actions they, in some respects, controlled in the building of the houses. The local sanitary authority made bye-laws, and the duty imposed upon it,—as it assumed to itself the right of laying down rules as to the materials of which houses should be built, the method of construction, and so on,—placed it before the ratepayers as a body which existed, amongst other things, for the purpose of securing healthy dwellings, at any rate, in future. That was the duty imposed upon it, and the duty which it had taken upon itself to carry it out. Now, taking the question of draining, the local authority constructed a sewer, and told the house-owner to drain into it, and they had already arrived at the view that every local authority ought to have at least as much power as the Commissioners of Sewers had in the City of London, because if the local authority constructed the sewer, and told the owner to drain into it, it was on the ground that it had a right to compel the owner to dispose of the excreta of his house, and send them down the drain to be carried away, so as not to be a nuisance either to those in the house or in the neighbourhood. On the other hand, their obligation was not to send back sewer-gas into the house; but the local authority could not fulfil that implied contract unless it had control, first of all, over the junction of the drain with the sewer just outside the house; and, secondly, it could not fully fulfil that contract unless it had some knowledge and supervision over the drains and similar arrangements of the house. The same remarks applied to the supply of water and gas. In many towns these were supplied by local authorities, and where they were not, they were supplied by companies by virtue of law, but it was surely part of the duty of the local authority, or it should be, to see that water and gas were supplied under conditions which were consistent with the health of the population. Practically speaking, what a condition of utter helplessness were people in when taking a house! It was a matter of notoriety that a man might go and buy, or take for a long term of years, a house, and he had no guarantee that there was any connexion between the drain and the sewer at all; and, in many cases, even after the experience of illness and death in the house, he had at great expense to have the floor and basement of the house taken up, and then to have the road taken up to the sewer in the middle, and find there was positively no connexion at all between the house-drain and the sewer itself. That was too dangerous a state of things to be permitted, and it was part of the duty of the authority to prevent the possibility of such a fraud. If you had introduced in the house drains or water supply, or anything of the kind, as covered work, you were at the mercy of your tradesmen; you had no plans—you did not know anything about drains, the pipes all over the house were left out of view,—there were no means of knowing where they were, so that the householder, whatever his general education and intelligence, was helpless in the hands of the tradespeople who lived by this kind of work.

The resolution, as amended, was then put, and carried unanimously.

## BRICK AND TILE MAKING AT PLUCKLEY.*

MY object in the present paper is to describe more particularly the processes of manufacture as carried out by the Kent Brick, Tile, and Pottery Company upon their works at Pluckley Station. The clayfields now worked by this company were originally taken from Sir Edward C. Dering, bart., by Mr. William Tongue, builder and contractor, of Plumstead, who opened the works and put down a considerable portion of the present extensive plant. But no sooner had the qualities of this clay for the manufacture of superior bricks and tiles and pottery goods generally been properly tested and fully established, than the lessee applied for and obtained powers to form a limited liability company, to whom the lease of fifty years was eventually transferred. By this company the works have since been carried on under a board of directors, with Mr. Edwin Hughes, of Green's End, Woolwich, as chairman, and Mr. Talfourd Hughes as secretary. Machinery of the most modern and improved kind has been introduced; and the results have been in the highest degree satisfactory to the proprietor of the estate, the lessees of the works, and the shareholders of the company generally.

The machinery employed is driven by a steam-engine of 35 nominal horse-power, having a 3-ft. length of stroke, and a fly-wheel 14 ft. in diameter. The kilns at present in use consist of a "Hoffman," elliptical in form, and 200 ft. long by 100 ft. broad, having in all fourteen chambers, and capable of holding 400,000 bricks; the main shaft is 150 ft. high, 14 ft. in diameter at the base, and 7 ft. at the summit. This kiln is burnt entirely round in periods varying from four to five weeks, according to circumstances. There are also four Scotch kilns, taking 60,000 bricks each, which can be set, burnt, and emptied once in a fortnight; and four Staffordshire kilns for burning blue goods, which hold 30,000 each, and take rather a longer time to burn. The produce of these kilns is the celebrated "blue pavior" which is now being sent from Pluckley Station to all parts of the country.

The machine-house is fitted up with Murray's complete plant for permanent works, with a slight deviation in the mode of drawing the wagons of clay out of the pit, these coming up

* From a paper by Mr. Alfred J. Burrows in the *Journal of Forestry and Estates Management*.

full and returning empty in a continuous stream. Besides the winding gear for drawing up the clay in tip-wagons, this machine comprises ribbed and plain crushing-rollers, a mixing-pan, pug-mill, and compression rollers, which send out a continuous stream of clay on to the side delivery-table, which cuts ten bricks at one stroke, and is capable of turning out 25,000 per day. These are placed upon the hack-barrows, and run off at once to the hack-ground, which is fitted up according to Kemsley's patent, with corrugated iron roof and canvas curtains.

By the use of the patent continuous-delivery machines, fitted up with the lubricating solid die and patent cutting-table, a non-intermittent stream of clay can be worked, and an important saving both of power and manual labour be effected. These machines are so easily fitted up that they can be removed so as to follow the position of the clay, and they may also be obtained with an automatic cutting-table.

By means of an improved brick-cutting table, the clay issuing from the die of the machine is received on the left hand of the table, and when a sufficient length for from eight to twelve bricks has passed out, this is cut off, as it travels, by a single wire, and passed by hand behind the fixed cutting-wires. The lever on the right hand is next thrown over, and advances the thrust-plate, which places the block of clay parallel with the cutting wires, carrying it up to and through them on to a movable board, with which they are at once transferred to the barrow without being handled. The chief advantages thus obtained are that from 2,000 to 3,000 more bricks can be turned out in the day by this avoidance of stoppages and waste, and the bricks are very superior in quality, and mathematically accurate in shape, and the finish of the cut is perfectly clean, without the slightest tear or raggedness, so that the value of the bricks for finished work is thereby considerably enhanced.

All tiles are moulded plain, and in the case of hips, valley, and ridge tiles, the bend is given afterwards by placing them upon a horse of the proper shape. The corrugations of pantiles are imparted in a similar way. It is now customary to give each plain tile a couple of nibs for fixing it instead of perforating it and fixing with pegs as formerly. The nibs are put on by a separate operation in the press, but by the use of the patent pipe and tile machine of Mr. Murray, manufactured by Messrs. Thomas Middleton & Co., of Southwark, any kind of fancy tile can be completed in one operation. The smaller, or 2 in. drain-pipes can be turned out by it at the rate of 8,000 per day; and if fitted with the patent lubricating solid die, it will put out 10,000 bricks per day. It also makes the ordinary corrugated tile as well as the improved Bridgewater and Spanish tiles. One great advantage of the tile-making machine is the production of the continuous nib-tile by the use of a die. By the use of the lubricating solid die a perfect stream of clay with sharp arris is obtained both from mild and strong clays. This die can be adapted to brick-making machines of all kinds, either with or without the cutting-table.

The bricks and tiles intended for blue goods are manufactured from the upper and second beds of the clay, which are of a light fawn or yellowish colour. This is dug, watered, and weathered somewhat in the usual mode adopted in the manufacture of plastic clays, being wheeled into heaps and turned once or twice. From this is also made the wire-cut bricks and tiles of various kinds. Some of the layers contain a considerable amount of oxide of iron.

The pressing of chequered and other paving bricks, tiles, &c., and the manufacture of pottery-ware, is carried on in a spacious enclosed drying-shed, 168 ft. long by 104 ft. wide, the roof being boarded and tiled and properly ventilated, and supported by brick pillars. This shed is heated by underground flues, which convey through it the escape steam from the engine. In this shed is also to be seen a potter busily employed in turning out common flower-pots, chimney and sea-kale pots, jars, ornamental vases, and a variety of other goods for which the Pluckley clay is eminently adapted, but for the proper burning of which the company has at present no special kiln.

In the moulding of tiles of various kinds, the finest sifted coal-dust is used. The "stable paviors" are at present pressed by hand in Dutton's lever press, which can also be used for tiles by simply changing the die. The tiles thus produced have, of course, to be horsed singly, an operation which is performed after they have lain two or three hours upon the hot floor. The shrinkage of this plastic clay is considerably more than that worked upon the semi-dry process, to be afterwards described.

One of the principal features of these brick-works is the semi-dry process, by which the lower layers of clay are brought direct from the pit and tilted at once into the hopper which feeds Bradley & Craven's clay-grinding mill, with revolving pan and perforated bottom. To insure the continuance of this process, even in the wettest weather, a supply of dry clay is generally kept in the spacious room over the machine-house, which is 60 ft. long by 40 ft. wide. As soon as the clay is sufficiently ground, it passes through the bottom of the pan into a receiver, from which it is thrown out by automatic scrapers into another receiver, from which it is carried to the floor above by cups working upon an endless rubber-band, similar to those employed to elevate the thrashed corn in a thrashing-machine. The ground clay next falls upon the floor above, from which it is conveyed through canvas shoots to the pressing-machines working below. These machines, manufactured by Parker Brothers, are three in number, and each one is capable of turning out 50,000 bricks per week. Each machine produces very superior bricks, and delivers from one mould-box a much larger quantity in a given time than has yet been made by any other machine at present before the public. The superiority of quality lies in the fact that the brick itself undergoes a similar process to pugging within the mould-box in which it is pressed, and thus saves an intermediate process, which, as most brick-makers are well aware, is indispensable in all cases wherein the object mainly sought is a good ringing quality of brick, in place of the easily disintegrated blocks, usually produced under the semi-dry system. If Chamberlain's patent appliance is worked in conjunction with the press designed by the patentee for the purpose of re-pressing the bricks as they are made by the machine, bricks are produced that cannot be distinguished from those made from plastic clay and re-pressed; these are facing-bricks of the very best quality. The machines under notice are simple, powerful, and not likely to get out of order; the bricks turned out are true in form, and sufficiently hard to go direct to the kiln. The quantity produced varies with different clays, but the limits lie between fourteen and twenty-three bricks per minute, and the power required for such a production is very small. Under the most favourable circumstances of grinding and delivery, the clay is not more than from ten to fifteen minutes out of the pit before it is moulded, pressed, and stacked in the kiln.

As it leaves the canvas shoot the ground and finely-granulated clay passes into a measuring-box, 9½ in. by 8 in. by 5 in. in its internal dimensions. Each forward movement of this box deposits the contents in the die of the machine, where it receives a pressure of 30 tons, and is by the next movement pushed forward upon the plate. Its size is now 9½ in. by 4½ in. by 3½ in. A woman places it upon the press, where it is subjected to a second pressure of about the same force as the former, and comes out measuring 9½ in. by 4½ in. by 2⅞ in. A second woman removes it from the press to the back-barrow, and it is at once delivered into the kiln, where its shrinkage in burning reduces it to 9 in. by 4⅜ in. by 2⅝ in.

The principal kiln in use here is built in accordance with the invention of M. Hoffmann, of Berlin, and patented in England by Mr. H. Chamberlain, a pottery engineer, who supplies the designs. It is elliptical in shape, having outside doors to each of the fourteen chambers, through which the bricks are wheeled in and out. The fuel, which consists of finely-sifted coal, is let in through apertures in the crown of the arch, and these are kept covered up with close-fitting iron caps. The smoke-chamber surrounds the central chimney, and flues leading from the bed of the furnace communicate with this. The bricks are so packed that the fuel passes freely amongst them, firing as it descends. Between every two chambers is a large intercepting damper. When in full work, any of the two chambers may have their doors open at one time, the one being emptied and the other filled.

By the use of the Hoffman kiln all the gaseous substances set free by combustion are carried on by the current of air to dry out and prepare for burning the bricks in the further chambers.

The quantity of land at present leased by the Kent Brick and Tile Company is twenty-three acres, and they have power to add to this from time to time, as may be found necessary.

## THE NEW TOWN HALL, BOOTLE.

STORETON STONE.

THE foundation-stone of the new Town-hall of Bootle-cum-Linacre was laid by the Mayor (Mr. J. P. M'Arthur), on the 8th inst. The site of the new Town-hall is at the junction of Trinity-road and Oriel-road. It is intended that the entrance to the public offices in Trinity-road shall have an effective appearance. Immediately on entering there will be a large hall and corridor giving access to the town-clerk's offices. The School Board office adjoins the entrance. The large hall will have an area of upwards of 3,500 superficial feet, with platform at one end, and retiring-rooms for the performers. In the Council Chamber, which will be on the ground-floor, there will be a gallery for the reporters, approached from the staircase. The whole of the building is planned so that if necessary additional offices could be placed on either frontage without interfering with the working arrangements. The building is designed in the style of the period of Francis I. The fronts will be executed in Yorkshire parpoints; with Storeton stone dressings, and, in order that the structure may be better seen, it will be set back three yards from the Trinity-road and eight yards from the Oriel-road frontages. The builder is Mr. Samuel Webster, of Bootle, and the architect is Mr. John Johnson, of London.

We note that, at a recent meeting of the Bootle Town Council, Mr. Alderman Newell moved the following resolution:—

"That the memorandum on the General Purposes Committee's proceedings of April 7th, 1880, page 236, relative to yellow Storeton stone, be rescinded, and that white Storeton stone be used."

Alderman Newell said he brought the motion forward because he considered that the architect in the matter had not worked in the business way that an architect to the building (the Town-hall) should do. The speaker then went on with the view of showing the superiority of the white over the yellow Storeton stone. Bebington Church, he said, was composed of the former, and was 700 years old. On the other hand, the yellow Storeton stone was being used for the St. Helen's Town-hall, and when the building was half up, for some reason or other, the stone changed from yellow to white.

Mr. Leslie.—That is wrong; it is not true.

Alderman Newell, continuing, said he knew that Mr. Leslie was the contractor for the building, and his information went to show that it was worked with yellow stone for a certain period, and with the white afterwards.

Mr. Leslie explained that the stone which had been used in the erection of the Philharmonic Hall and the Rev. Hugh Stowell Brown's chapel, viz., the white stone, could not be got at present. He had used more Storeton stone for the past fifteen years, he would venture to say, than any other contractor either in Liverpool or Bootle, and he said there was no practical difference between them. He hoped the motion would be met by a decided negative.

The Mayor put the motion to the meeting, when Alderman Newell voted for, and all the other members of the Council against, it. The motion was therefore lost.

**A New Mission Home, Kilburn.**—Mr. R. Bilke, of Victoria-road, Kilburn, under whose management this work has been conducted nearly the whole time of the existence of the mission, having secured a suitable piece of land in Kilburn-lane for the purpose of erecting a new building to be called the Queen's Park Hall, a contract has been entered into with Messrs. Hook & Oldrey, of Kensal-road, who have arranged to complete the whole of the buildings by Michaelmas Day. The plans have been prepared by Mr. Edward Heffer, architect, of Victoria-road. Besides the large hall, which will have an open timbered roof, boarded and varnished, there will be a room for inquiries, retiring-rooms, and kitchen, fitted up with the requisite conveniences for tea meetings, &c. The exterior of the building, although simple in its proportions, will be pleasing in character. The foundations are now commenced.

## GREEK PAINTED VASES.

PROFESSOR NEWTON'S ninth lecture* (a supplementary one) to students of University and King's Colleges was given on the 7th inst. and concluded the course on ancient Greek art. It treated of the designs on Greek painted vases. These vases formed a distinct branch of fictile or ceramic art; the designs with which they are decorated might, therefore, be called specimens of Ceramography. The earliest examples of such designs carried us back to the earliest period of Hellenic, and, perhaps, of pre-Hellenic civilisation. In the rudest of these specimens, found at Athens, Mycenæ, and Rhodes, the human figure rarely occurred, or, if represented, was drawn as a child might draw it. A large class of this early pottery was ornamented either with geometrical or floral patterns. Next came the style now called Asiatic, because believed to come from a Babylonian or Assyrian source. In this style zones of animals, with occasionally winged monsters, encircle the vase, and in the blank spaces between these animals are flowers and symbols. As drawing improves in this style, the human figure is introduced, with something like dramatic action, and the subject represented is explained by names written over the figures. The lecturer illustrated this phase of ceramography by a design on a Rhodian vase on which was represented a scene from the Trojan war, in which Hector and Menelaus are fighting over the body of Euphorbos. In the next stage of the art the figures were painted in black on a red ground, the details of anatomy and other inner markings being rendered by incised lines and conventional colours. The drawing in this style is generally harsh and full of archaic mannerism. A further change was introduced by making the ground of the picture black, the figures being red with inner markings drawn in faint lines of a deeper tint of red. Small details and accessories were picked out with other colours; but, as the predominant colour was red, these designs might be called monochrome. This style probably began as early as the time of Polygnotus or earlier, and continued till the time of Alexander the Great. At Athens and in Sicily and in a few other places we meet with another contemporary style of vase-painting, in which the figures were painted in several colours on a white ground. A very beautiful specimen of this style was to be seen in the British Museum,—a Rhodian cup, inside which is painted Aphrodite riding on a swan. This vase is probably of the time of Phidias. Both in the monochrome style, with red figures, and in the contemporary polychrome style, there was no attempt at chiaroscuro, and yet the painters who decorated these vases were the contemporaries of Apollodoros, Zeuxis, Parrhasios, Pausias, by whom, as we know from Pliny, chiaroscuro was gradually developed by a series of steps. The reason why this improvement in the art of painting so little affected ceramography was mainly that the convex or concave surface of the vase was better adapted to a design kept very flat than to one which by chiaroscuro suggested the idea of relief, and because in the great age of art the composition of the vase-picture was determined in most cases by the form of the vase itself, which was regarded, like the triangular space of a pediment, as an architectonic necessity. The absence of chiaroscuro, again, led the vase-painter in the best period to avoid complicated foreshortening and groupings; the face is generally seen in profile, and the figures are kept in one plane. In the contemporary polychrome style the colours are harmoniously combined, but not modified by light. About the time of Alexander the Great, when the eye of the Greeks was dazzled by the splendid colouring of Apelles, and when increased private wealth led to a more sumptuous style of decoration, several innovations were made in vase-painting. In the designs with red figures we find gilding introduced, and here and there a figure in white. Other colours were used in the accessory details. One of the finest examples in this style is a vase from Camirus, in Rhodes, representing Thetis carried off by Peleus, in which the wings of Eros are painted blue, and the mantle of Thetis sea-green. The drawing of this vase is most masterly. In this and the subsequent Hellenistic period we find vases of immense size, on which are painted designs in several planes; from the absence of aërial perspective the more distant figures appear to be higher up in the picture than the nearer ones; rising ground is indicated by irregular lines of dots, but there is no attempt to represent landscape, except by conventional adjuncts, such as a single tree to represent a forest. In the later specimens of this style, the drawing, though showing great facility and dexterity, is often careless and faulty, and the types are effeminate. With regard to the subjects of vase-pictures, we find in the earlier style a preference for scenes of war and the chase, and recognise many subjects from the Homeric and Cyclic poems; in the finest period of art these subjects still recur, together with many other myths not previously familiar to us, because not celebrated in extant classical literature. Agonistic scenes were also abundant in this period. In the later style of the Hellenistic period there is a preference for more effeminate subjects taken from Dionysiac or Erotic myths. Scenes where mourners bring offerings to a tomb were also common in this style. The lecturer then explained a number of drawings of vase-pictures illustrating the different periods.

* See pp. 24, 55, *ante*.

## DISPOSAL OF TOWN REFUSE: LIVERPOOL.

MR. J. A. FORREST, the chairman of the Scavenging Sub-committee of the Liverpool Town Council, has drawn up a report as to the annual inspection of wharfs, depôts, stables, &c., owned by the Corporation. The most interesting portion of the report relates to the disposal of town refuse, and from this portion we extract the following particulars:—

Since the commencement of the current year the experimental knowledge of the Health Committee has been advanced one step further, with regard to the best and most economical means to be adopted for the final disposal of those products of scavenging operations which possess no value to the farmer. In 1879 the Council sanctioned the purchase of a steam-hopper barge to be used for the purpose of conveying to sea a large quantity of unsaleable refuse collected from the South-end of the city, similar in character to that which had been previously got rid of by being utilised for raising the levels of proposed new streets, or had been sent at considerable cost to fill up marsh-lands abutting upon Bromborough Pool and the Lancashire Canal. The tender of Messrs. Simons & Co., of Renfrew (2,400*l.*), for building the barge in accordance with plans prepared by the then borough engineer (Mr. G. F. Deacon), was accepted in February, 1879, and the barge was delivered in December. So soon as arrangements for the registration and equipment of the vessel (which has been named *Alpha*) had been completed, the trial-trip was made, and she has since been regularly employed, except for a few days, when, through stress of weather, it was not safe for her to proceed to sea. The results of the working of the *Alpha* for three months are detailed below, together with a statement of the cost incurred on the disposal of South-end refuse by canal during the corresponding period of 1879:—Disposal of refuse from the South-end by ordinary barges, to land on the Lancashire Canal, from February 1st, 1879, to April 30th, 1879, 2,425 tons at a cost of 2s. 7¼d. per ton; disposal of refuse from the South-end by steam-hopper barge *Alpha*, about 4 miles beyond the North-West Lightship, and in not less than 16 fathoms, from February 1st, 1880, to April 30th, 1880, 9,650 tons at a cost of 1s. 6¾d. per ton. The total cost per ton in each case comprises all charges except rent for dock accommodation, and includes the cost of loading, which has chiefly been by manual labour. Arrangements are now pending with the Mersey Docks and Harbour Board, by which a berth-space having sufficient and convenient quay accommodation will be assigned for the use of the barge, and thus admit of steam or hydraulic power being employed for loading. This, when accomplished, will probably be the means of a further saving being effected. It must be observed that the saving in cost, as indicated by the comparative statement, is to be regarded as relative rather than absolute; because, owing to failure of available places of deposit in the city, the quantity of refuse so disposed of at a trifling cost near the South-end was only 3,316 loads for the three months of 1880, against 9,732 for the same period of 1879. In a short time all the refuse from this division will have to be disposed of by the barge. It is to be expected that the cost per ton for the disposal of refuse by the *Alpha* will be further reduced as the necessity arises for a larger quantity to be got rid of at sea; because, with the exception of two cargoes that had to be sent up the canal during the time the steam-hopper barge was prevented by weather from making her regular trips, she has carried all the refuse sent to the south wharfs, so that her capability of making a greater number of trips has not yet been thoroughly tested. The sub-committee have had under consideration the subject of destroying unsaleable refuse by fire; and, from investigations as to the cost of working the system in Leeds, they are of opinion that its adoption in Liverpool would not be advantageous.

## INDEX SOCIETY.

THE second annual meeting of this Society was held on Friday, the 9th inst., in the rooms of the Society of Arts, when the chair was taken by his Excellency the American Minister, Mr. James Russell Lowell. The report contained an account of the work already accomplished, and of that which is in hand, or can be put in hand as soon as the list of subscriptions is enlarged. Among the indexes issued through the Society are many referring to literature and history, but science is not overlooked. A "Hand-book of the Literature of Botany," by Mr. Daydon Jackson, the secretary of the Linnean Society, is just ready for the press, and a companion volume for meteorology is proposed. Indexes of logic and anthropology also find a place in the list of schemes. The further business of the meeting consisted in the election of the new council and in the passing of resolutions for the appointment of committees to consider the best means for carrying out the following objects:—1. The indexing of biographical collections, especially those contained in the *Annual Register* and the *Gentleman's Magazine*. 2. The indexing of Roman remains in Great Britain. 3. The desirability of opening an office to contain the printed and MS. indexes and other papers of the Society.

The Chairman, in his opening remarks, said that it was a gratification to him to have been asked to preside on the occasion, more particularly as it was a sort of recognition of the cosmopolitanism of the Republic of Letters, and gave him an opportunity of expressing that good feeling between the two countries which he always liked to cherish. The objects of the Society were also of much interest to him, and he should do his best to bring them before his fellow-countrymen in the United States, and endeavour to secure their co-operation and assistance in promoting the work which the Society had in view.

## THE METROPOLITAN RAILWAY COMPANY'S EXTENSION TO HARROW AND RICKMANSWORTH.

THE Metropolitan Railway, which, within the last twelve months, has been extended in a north-westerly direction from the Swiss Cottage to Willesden-green, will be still further extended in that direction at the commencement of the ensuing month, by the opening of the new line between Willesden-green and Harrow, adding to the Metropolitan's company's system an increase of five miles and a half in length. The line, which has for some time past been in progress of construction and is now completed, contains a considerable amount of engineering and general structural work, taking into account its short length. There are no fewer than twelve bridges between the commencement of the line at Willesden-green and its terminus at Harrow, several of them being massive and costly structures. The station buildings are constructed on iron girders immediately over the line, and on a level with the highway, the railway platforms beneath being reached by staircases from the booking offices. The station at Harrow is a spacious structure, having, in addition to the booking-offices, both general and ladies' waiting-rooms. The station buildings are in red brick, with terra-cotta for dressings and ornament, and have a high-pitched roof covered with red tiles. The upper portions of the windows of the booking-office are ornamented with stained glass. The line has been constructed by Mr. Joseph Firbank, the contractor, under the superintendence of Mr. C. Liddell, C.E., the company's engineer-in-chief, and Mr. Tomlinson, the resident engineer.

It may be added that there is every probability of the line being shortly still further extended to Rickmansworth, the Bill for such extension having just been passed by the Committee of the House of Commons, notwithstanding that it was strongly opposed by the London and North-Western Company.

## OUR CHURCH MONUMENTS.*

THE destruction of sepulchral monuments which is being rapidly accomplished, year by year, during the process of modern church restoration, demands the serious consideration and united action, not only of archæologists, but of all who are interested in the preservation of their ancestral memorials.

One example in the county of Essex, which, if not of quite recent occurrence, is of quite recent public disclosure, may be cited; not that it is by any means an isolated illustration, but that it exhibits one of more than ordinary wanton desecration. Not less than seven tombs have been despoiled of their brasses, which have passed into different private hands; but the altar tomb of Sir Anthony Brown, chief justice of Common Pleas, and the munificent founder of the richly-endowed grammar school which exists in the parish of South Weald, has been demolished, and other sepulchral memorials have been ejected from the church. Such is, in brief, the published narrative of a resident gentleman, and it has a very important bearing in connexion with the "Report of the Sepulchral Monuments Committee of the Society of Antiquaries," presented to Parliament in 1872.

In February, 1869, the First Commissioner of her Majesty's Works requested the council of the Society of Antiquaries to furnish him with a list of such regal and historical tombs or monuments existing as, in their opinion, it would be desirable to place under the protection or supervision of the Government, with a view to their proper custody and preservation. Acting upon this a committee was formed, who, in drawing up their resolution, say,—"We had regard, not to the value of the monuments as mere works of art, but to the importance of the persons commemorated as actors in the great drama of our national history, and that in any scheme for the protection of these monuments the object in view would be rather the conservation of existing memorials of our illustrious countrymen than the mere gratification of artistic taste or antiquarian curiosity; and that in this respect the simple monument of John Locke was more worthy of record than the more sumptuous monument erected to a person who had left no trace behind him in the history of his country." While admitting the abstract truth of this proposition, the obvious reply is,—"This ought ye to have done, and not to have left the other undone"; and, besides, a large number of historical monuments *are* excluded from the catalogue. It is true that the committee say elsewhere, with just appreciation of the importance of the subject,—"A church, which to-day seems liable to no molestation, may, to-morrow, at the suggestion of an ambitious architect, an ignorant committee, or a speculator in glazed tiles, be turned inside out; chantry chapels destroyed, and tombs needlessly removed from the honoured graves which they once marked; the model slabs which recorded the burial of persons of historical importance allowed to be broken and carried away; or even, as in cases frequently reported to the Society of Antiquaries, the whole floor of a country church, with all the inscribed flag-stones, may be permanently concealed by a new encaustic-tile pavement. These things being so, it would seem that any measure of protection must apply to the whole list of monuments deemed worthy of preservation; and whatever the immediate probability of their careful preservation by the local authorities, or of their liability to injury, whether from carelessness, ignorance, or malice."

This report, presented to Parliament and published eight years ago, was favourably reviewed by the press, and received by the public with approval; but no legislation has ensued upon it, and it is practically nugatory. The desecrations which the Society of Antiquaries deplore continue rife throughout the country, and the depredations during the last eight years have probably not been less than in those which have preceded; indeed, one of the twenty tombs in the county of Essex which fell within the limited scope of the inquiry, as that of a chief justice, has been destroyed in the very face of it; nor need we doubt that had the tomb of John Locke stood in South Weald church, instead of at High Laver, the same fate would have befallen it. The same arbitrary will which disregards alike objects of art and antiquity, and the feelings of those who may possess ancestral monuments, would probably treat with the same reckless indifference the tomb of the great English philosopher.

The elaborate report is practically consigned to oblivion, or remains upon our shelves merely as a convenient index to a certain class of monuments. What is the remedy to put a stop to this continuous spoliation? Naturally we should look to the Society of Antiquaries to press upon the Government the urgent necessity of immediate legislation. Firstly, by procuring a complete registration of all sepulchral monuments, and then holding the incumbents and churchwardens responsible for their preservation. But this obvious step has never been taken. It is the duty of all societies, and, far more, of society at large. Until the monuments are fully registered, and the clergy made responsible for them, removal, concealment, and destruction will go on quietly as heretofore.

* By Mr. Charles Roach Smith. This will form part of the next volume of his "Collectanea Antiqua."

## TWO ART CRITICS.

AMONG the studios we find
Critics are of varied kind;
Some being useful, others not.
Now suppose that you have got
Your picture into such a state
As makes your misery very great,
And much and long you cogitate
Whether it should be so, or so.

Now comes the first. He does not throw
Himself the least into the spirit
You are labouring to give it,
But only thinks of his own thought,
Reckoning your idea as nought,
And counsels you to change it quite
To suit his own idea of right;
And bores you with a tedious lecture
How *he himself* would paint the picture.

At last he goes: the which you find
A mercy: when, of different kind,
Another calls, of juster mind:
For what he sets himself to do
Is to grasp the meaning *you*
Wish to represent. That done,
Then his mind's at once addrest
So to counsel, how the best,
Your cherish'd object may be won,
And most thoroughly exprest,
This point enhanced, and that suppress
With advantage to the rest;
But all in accord with the scheme
Of your picture, and its theme.

Now, not like the first who came,
This one puts in better frame
Your spirits, which were somewhat low;
And when he takes his hat to go,
You are most grateful he has been;
For 'tis clearly to be seen,
That, thanks to his appreciation,
And remarks on this occasion,
Your picture's prospects are much brighter,
And your labour's render'd lighter.

This is the critic, do you see?
That I should wish to call on me.

B.

## LARGE SALES OF CORPORATION GROUND RENTS.

THE Corporation have just realised the large sum of 37,131*l.* from the sale, by tender, of a number of City ground-rents, arising out of the property purchased by the corporation under the Holborn Valley and Clerkenwell Improvement Acts. These ground-rents include one of 536*l.* 5*s.* on a house at the north side of Charterhouse-street, let on lease to Mr. Henry Beyfus and Mr. Albert Boss, for eighty years from December, 1874. It realised 13,551*l.*, the purchasers being the Governors of Queen Anne's Bounty. A ground-rent of 350*l.*, arising from a house situate on the west side of Farringdon-street, and on the north-east side of St. Bride-street, and let on lease to the British Mutual Investment Company for eighty years from June, 1872, was purchased by the Prudential Assurance Company for 8,775*l.* Another ground-rent, amounting to 258*l.*, on a warehouse in St. Bride-street, let on lease to Mr. Hugh Birley, M.P., and others (Charles Mackintosh & Co.) for eighty years from December, 1872, was sold for 6,650*l.*, Mr. Henry Grose Smith being the purchaser. Mr. Smith was also the purchaser of a ground-rent amounting to 157*l.* 7*s.* on a warehouse on the west side of Farringdon-road, leased to Mr. Henry William-son for eighty years from March, 1877. The purchase-money was 4,150*l.* Another ground-rent of 153*l.* 17*s.* on a warehouse on the west side of Farringdon-road, let on lease to Mr. G. S. Mamford for eighty years from June, 1875, was purchased by Mr. F. G. Eiloart for 4,005*l.*

## FURTHER SALES OF BUILDING ESTATES.

THE sales of extensive plots of building land in several districts around the metropolis continue to follow upon each other in rapid succession. On Monday evening Messrs. Protheroe & Morris offered for sale, at the Castle Tavern, High-street, Tooting, 133 plots on the Carrington estate, in Upper Tooting, formerly known as Messrs. Rolleson's Nursery, which has now been laid out for building upon. The estate was described as having important frontages to the High-street, and also to new roads now in course of formation, all to be constructed and sewered in accordance with plans approved by the Metropolitan Board of Works. With the exception of the intended shops fronting the high road, which contain a larger area, the several plots have a frontage of 15 ft., with a depth ranging from 40 ft. to about 90 ft. After some introductory remarks from the auctioneer, the sale commenced with the plots set apart for shops, of 16 ft. frontage and 60 ft. to 80 ft. in depth, which realised from 200*l.* to 210*l.* each. The other plots of 15 ft. frontage by 40 ft. to 80 ft. and 90 ft. in depth, were sold at prices ranging from 37*l.* to 75*l.* each. At the close of the sale the auctioneer announced that all the lots (excepting a block of land in the rear, containing an area of upwards of an acre, which was withdrawn at 2,975*l.*) were sold, realising a total sum of about 8,500*l.*

Last week Messrs. Protheroe & Morris also offered for sale the second portion of the Clements Estate at Ilford, consisting of ninety-three lots. Although the sale was not so largely attended as on the first occasion, there was an eager competition for the various plots. The front plots in High-street realised from 175*l.* to 210*l.* each; and those in the other roads from 50*l.* to 90*l.* each. With about a dozen exceptions, all the plots were sold.

On Monday evening, Mr. Alfred Baker, of the firm of Messrs. Baker & Sons, offered for sale, at the Windsor Castle Hotel, Hammersmith, the Walham Lodge Estate, near Walham-green, which is being laid out for building upon. The estate has been divided into ninety-six building plots, and the first portion, advertised for sale on Monday last, consisted of forty-eight plots, but the demand was so great that the whole of the lots, at the request of the company who are laying out the estate, were included in the sale, and the whole of the lots were sold. The plots fronting the Fulham-road, which are intended for shops, some of them having a frontage of 16 ft., and others 20 ft., with an average depth of 50 ft., realised from 205*l.* to 265*l.* each, whilst the other plots of 16 ft. frontage, and about 40 ft. in depth, fetched an average of 90*l.* each. The prices were considered good. The total proceeds of the sale amounted to 10,227*l.*

## THE WESLEYAN CHAPEL YARD, TOTTENHAM.

I WISH to call attention again to the disgraceful condition of the above-named yard. Its state is most deplorable for a (so-called) Christian burial-ground. The faithful should at once subscribe for an iron railing as a protection against the reckless and destructive propensities and illicit practices of unruly boys.

CYCLOPS.

## BUILDERS' TENDERS.

SIR,—I am astonished almost every day, on receiving bills of quantities, to find continued the objectional words, "I hereby agree," in the form of tender. I think there cannot be two opinions as to the absurdity and danger of such words, which really form a contract, when in nine cases out of ten the conditions have not been considered. Of course the builder is frequently told the conditions are ready for his perusal, but, I take it, a builder who is constantly tendering has quite enough to do without studying voluminous contracts, neither can he think of going to the necessary expense of submitting the same to his solicitor before the result of the tenders is known.

LONDON BUILDER.

## EXCURSION OF THE ARCHITECTURAL ASSOCIATION.

ON the present occasion the committee have decided to visit the neighbourhood of Norwich, and Mr. James Fowler, of Louth, has consented to generally conduct the visits.

The following is the sketch programme. Head quarters, Norwich:—

*Monday, August* 16.—The Cathedral and adjoining buildings. Churches of St. Peter Mancroft and St. Stephen.

*Tuesday.*—Rail to Aylsham. Carriages thence to Cawston, Sall, and Blickling (Church and Hall).

*Wednesday.*—Rail to North Walsham. Carriages thence to Trunch, Knapton, Edingthorpe, Bromholm Priory, and Worstead.

*Thursday.*—Rail to East Dereham and Fakenham. Carriages to East Barsham Hall.

*Friday.*—Rail to Wymondham. Carriages thence to Attleborough, Great Ellingham, Hingham, and Deopham.

*Saturday.*—St. Andrew's and Stranger's Halls, St. George's and St. Giles's Churches, &c., Norwich.

## CONGRESS OF THE BRITISH ARCHÆOLOGICAL ASSOCIATION.

THE annual meeting will, this year, be held at Devizes, from Monday, August 16th, to Saturday, the 21st, inclusive. An interesting programme has been issued, but it is too long for us to print. At the opening meeting, on Monday, the members will be received by the Mayor and Corporation, and the Right Hon. the Earl Nelson, president of the Congress, will deliver an inaugural address. Local antiquities will be inspected, and the churches of St. John and St. Mary visited and examined. A public dinner at the Bear Hotel will be held at 7 p.m. Abury and Silbury will be examined on Wednesday, with various papers on these antiquities.

Friday will be an interesting day. Members and visitors will drive by Enford and Netheravon to Amesbury. After visiting the church, the party will proceed to Vespasian's Camp, where luncheon will be partaken of, in conjunction with the members of the Newbury District Field Club, under the guidance of Mr. Walter Money, F.S.A., and at two o'clock all will leave for Stonehenge, which will be described and commented on by Mr. William Long, F.S.A., the Rev. A. C. Smith, Mr. Thomas Morgan, F.S.A., and others.

In the programme for Saturday, a visit will be paid to Bowood (by the kindness of the Marquis of Lansdowne, V.P.), with its gallery of historical pictures, &c., and luncheon will be partaken of in the park; afterwards proceeding to Laycock Abbey, the party will be received by its owner, Mr. C. H. Talbot. Papers will be read each evening, and two extra days will be enjoyed in the following week by those who will remain.

## EMPLOYERS' LIABILITY FOR ACCIDENTS.

SIR,—As I observe you take interest in this very important Bill, I venture to send you a small contribution to the facts, which I think is rather in your way. I am not an employer of labour myself, at least I am not so now, and my sympathies lie very strongly with the working-classes. But what will you make of the following case? Right opposite my house, at this moment, a church is being erected, and the method of elevating the stones to the scaffolding is by means of a derrick-crane with a pole about 50 ft. or 60 ft. in length, or rather, let me say in height. Well, this very morning I observed a stone being slowly raised which might have weighed probably half a ton, and right underneath it stood a mason hewing away at a piece of ashlar with the utmost composure. I shouted to him as hard as I was able, and held up my walking-stick; but he did not seem to understand me, and so I had to endure about five minutes of considerable anxiety. Had the least thing happened to the chains, or the winding gear, or the clippers, or in the cohesion of the block of freestone, he would have been killed on the spot. And I ask you, sir, or any man acquainted with the building trades, whether such incidents are not of frequent occurrence? I ask you, moreover, had such an accident occurred, who would have been responsible for this poor mason's death?

A SURVEYOR.

**A New Library** and other additions have just been completed at River Meade, Sunbury-on-Thames, for Mr. L. Knight Bruce, from the designs of Messrs. Pugin, of Westminster. Mr. John Dalglish, of Sunbury, was the contractor.

## THE SHARES IN LONDON WATER COMPANIES AND THE PARLIAMENTARY COMMITTEE.

THE proceedings of the Select Committee of the House of Commons, which is now taking evidence on the several London Water Companies, excite much public interest in the metropolis, and the announcement of a sale last week, at the Auction Mart, of a number of shares in two of the principal metropolitan companies, brought together a very numerous attendance. The auctioneers were Messrs. Fox & Bousfield. The property offered consisted of one-tenth of a share in the King's Moiety of the New River Company; five 100*l.* new shares in the same company; and forty 50*l.* shares in the Grand Junction Company. The shares in the New River Company were first offered, the tenth part of the King's moiety being divided into ten lots, each lot consisting of the hundredth part of a share. Mr. Bousfield, who conducted the sale, in his introductory remarks said that the New River Company never gave rise to speculation, and while other companies fluctuated, it remained firm in the position it had gained. The increase in the income had steadily advanced during the last sixteen years, amounting to 206,825*l.* in 1863, and 424,097*l.* in 1879. Adverting to the evidence given by Mr. E. J. Smith before the Select Committee of the House, he said he considered that the New River Company was likely to be taken by the Government, in which case they would have to pay a high compensation, which would increase the value of the shares; but it would be better still if the company was left alone, since the amount of increase in the value of their property in the next few years it would be difficult to imagine. All the ten lots forming the King's Moiety were sold for 920*l.* and 925*l.* each, or at the rate of 92,000*l.* for a full share; the 100*l.* new shares being next sold, and realising 380*l.* and 385*l.* per share, or nearly 300 per cent. premium. These were followed by the sale of the forty 50*l.* shares in the Grand Junction Company, all of which were purchased at 110*l.* 10*s.* and 110*l.* 15*s.* per share.

## RECOVERY OF FEES PAID UNDER PROTEST.

IN the Birmingham County Court, before Mr. J. Motteram, Q C, Judge, Mr. Brooke Robinson, solicitor, Dudley, brought an action against Mr. Julius A. Chatwin, architect, Temple-street, Birmingham, to recover 41*l.* 7*s.*, "for the return of fees overcharged by the defendant as architect appointed to report to the arbitrator, in the case of Holland *v.* Robinson, and which fees were paid by the plaintiff to the defendant under protest." The judge was assisted in his investigation by an assessor, in the person of Mr. W. Millican, F.R.I.B.A., of Leicester.

The present case arose out of an action tried last year, in which the present plaintiff was sued by Messrs. Holland & Son, builders, Dudley, in respect of certain alterations and repairs done to Barford House, Warwick. The action by Messrs. Holland & Son was originally brought brought into one of the courts, but was referred to Mr. Dowdeswell, who, in the course of the arbitration, instructed Mr. Chatwin to go through certain vouchers and make a report of the value of the work done by Messrs. Holland & Son, and the materials supplied by them. Mr. Chatwin made his report, and for his services charged 65*l.* 10*s.*, this sum also including the expenses of a journey to London, Barford, and Dudley. Mr. Robinson considered the charge excessive, and declined at first to pay it; but ultimately he paid the money under protest, and took up the arbitrator's award. It was now contended that Mr. Chatwin would be amply paid if he received 23*l.*, and the action was brought to recover 41*l.* 7*s.*, the amount in excess, after allowing for certain travelling-expenses. Mr. Chatwin was examined at great length as to the time occupied by him in investigating the accounts and measuring up the work. He estimated that he and his clerk were occupied fifteen days in the work, but declined to pledge himself as to the specific days on which they were engaged. Pressed by the Judge, Mr. Chatwin said he would have charged twenty guineas for the work if his labours had not been greatly increased by the interference of the plaintiff. He was questioned with a view of showing that the examination of the vouchers could have been done by a junior clerk instead of doing the work himself, and charging 3*l.* 3*s.* for his services: but he denied that a junior could have performed the work, and said it was necessary that the person examining the vouchers should have a knowledge of building.—Mr. Newey, defendant's clerk, estimated that he was engaged sixteen or seventeen days on the work; but upon being cross-examined as to the dates upon which he was employed he could not specify more than six days. His Honour, after consulting with the assessor, said they desired to be as liberal towards the defendant as they possibly could. They felt that even the time occupied for which remuneration was about to be given had not been supported by anything like evidence such as was necessary to support defendant's views. They had, therefore, disregarded that; but having been occupied over five hours, and having heard everything that could be said,—some of it not very regular,—and given every opportunity for both sides to be heard, the figures which the learned assessor put down, and which he concurred in, were 28*l.* 16*s.*, which, deducted from 65*l.* 10*s.*, gave the plaintiff a verdict for 36*l.*

## COMPENSATION CASES.

IN the case of *The Rector and Churchwardens of St. Mary Orgar* v. *The London and Blackwall Railway Company*, the arbitrator, Sir Henry A. Hunt, C.B., has made his award. The claim was for certain property in John-street, Minories, having an area of 10,455 superficial feet, with access from and cellars under Gough-square. The value put on the property by Mr. I'Anson, the claimants' surveyor, was 44,852*l.* Mr. George Barnes Williams, surveyor to the Mercers' Company, estimated it to be worth 42,716*l.*, and Mr. T. Horsey (Fuller, Horsey, & Son) put the value at 42,982*l.* On behalf of the railway company, Mr. Farmer (Debenham, Tewson, Farmer, & Bridgewater), valued it at 28,356*l.* Mr. Robert Ritchie's estimate was 28,688*l.*; and Mr. C. F. Adams put in a valuation at 28,693*l.* The property was required for the extension of Fenchurch-street Railway Station. The arbitrator has awarded 33,930*l.*

In the case of *The Weavers' Company* v. *The Metropolitan Board of Works*, heard on March 5th, before the same arbitrator (Sir H. A. Hunt), the award has also been made. The claim was for the premises, 1, High Holborn, at the corner of Gray's-inn-road, having an area of 4,498 ft., and a vault 250 ft. On behalf of the claimants, Mr. J. Jennings valued the property at 11,605*l.*; Mr. Edwin Fox (Fox & Bousfield) estimated it to be worth 9,240*l.*; and Mr. Virgoe Buckland, Mr. L. H. Isaacs, and Mr. R. C. Driver each put it at 8,167*l.* The witnesses for the Metropolitan Board of Works were Mr. E. N. Clifton, whose valuation was 6,517*l.*; Mr. F. W. Porter, who estimated it at 6,682*l.*; and Mr. Robert Vigers, whose figures were the same as Mr. Clifton's. The property was taken by the Metropolitan Board of Works for the widening of Gray's-inn-road. Sir Henry Hunt has awarded 7,177*l.*

## NATIONAL COURTESIES.

H.M.S. *Resolute*, which formed part of the late Admiral Sir Edward Belcher's expedition sent in search of Sir John Franklin, was abandoned on May 15th, 1854. She was discovered and extricated in September, 1855, by Captain Buddington, of the United States whaler, *George Henry*, and was taken to New York; the British Government waiving all claim to her. It appears that the sum of 40,000 dollars was voted by Congress to acquire her from the whalers, and she was then purchased, fitted out, and sent to England at the expense of the American Government, and presented to her Majesty Queen Victoria, at Southampton, on the 16th of December, 1856.

The ship having recently been broken up, a small portion of her timber, oak and teak, has been used to make a writing-table for presentation by her Majesty the Queen to the President of the United States. This has been executed by Messrs. Morant, Boyd, & Blandford, of Bond-street. Without being pretentious, it is a thoroughly good, sound, and handsome piece of work. In the first instance, as we mentioned at the time, it was proposed to execute a much larger piece of furniture for the purpose, and six firms sent designs in competition, from which that of the firm who have now executed the writing-table was selected.

## "ESSAY ON THE HISTORY OF ENGLISH CHURCH ARCHITECTURE."

SIR,—As I have learned that Mr. Edward Pococke has been soliciting, from architects and others, subscriptions to the above-named work, will you kindly allow me to state that he has no authority to do so, and that subscriptions can only be paid to Mr. David Bain, at the publisher's, Southampton-street, Strand?

G. GILBERT SCOTT.

**Paint.**—Certainly the ornamental railings on the Thames Embankment are in a remarkable state of preservation considering that the paint supplied by the Indestructible Paint Company was applied at their erection, now more than eight years ago. Though one portion of these railings has been exposed the length of time named to the action of the sulphurous acid given off by the locomotives of the Metropolitan Railway at a ventilating shaft close to Waterloo Bridge, it has not been affected in the least. The railings are quite intact, and show no sign of rust.

## THE YORKSHIRE FINE ART AND INDUSTRIAL INSTITUTION.

THE opening of the Summer Exhibition of Pictures and other works of art in connexion with the Yorkshire Fine Art and Industrial Institution took place on Thursday last. The collection in the Grand Saloon consists of oil paintings by eminent artists, as does also that in Gallery C South. Messrs. W. Q. Orchardson, R.A., J. C. Horsley, R.A., Herman Tenkatt, Brookes, Bayes, Walton, Burr, Wyke Bayliss, and others, are amongst the painters of works exhibited. Galleries D and E South are occupied by water-colour drawings. The contribution from South Kensington comprises photographs and other objects of interest, including a series of forty-five historical drawings, and Marks's noted pictures of May-Day; a choice collection of illuminations on parchment, of the fourteenth, fifteenth, and sixteenth centuries; a large number of photographs of ecclesiastical architecture, &c. The miscellaneous articles comprise six cases; the first contains a variety of objects in gold and silversmiths' work, and the second contains porcelain, including Sèvres, Dresden, and Flemish. The third case is interesting, as containing, amongst other articles, a vase and a cup and saucer, a portion of a plateau contributed to South Kensington by her Majesty the Queen. In the fourth is to be seen Italian majolica ware, chiefly of the sixteenth century. The next case contains wood carvings and carved musical instruments. The fifth is a case of Indian textiles, and the last is a case of electrotype reproductions from various collections, including a pair of fire dogs from the Royal collection in Windsor Castle; also vases from Lord Delawarr's collection. The site of what was the machinery annexe at the recent industrial exhibition in York has been laid out as a garden.

## PREMIUMS FROM THE INSTITUTION OF CIVIL ENGINEERS.

THE Council of this professional body have awarded the following premiums for some of the original communications presented during the past session on account of the science, talent, or industry shown in the consideration of the various subjects dealt with:—

FOR PAPERS READ AT THE ORDINARY MEETINGS.

1. A Telford Medal and a Telford Premium to E. A. Bernays, C.E., for his paper on "Portland Cement Concrete, and some of its Applications."

2. A Telford Medal and a Telford Premium, to H. E. Jones, C.E., for his paper on "The Purification of Gas."

3. A Telford Medal and a Telford Premium, to J. J. Webster, C.E., for his paper on "Iron and Steel at Low Temperatures."

4. A Telford Premium, to Frederick Augustus Abel,* C.B., for his paper on "Explosive Agents applied to Industrial Purposes."

5. A Telford Premium, to John Grant,* C.E., for his paper on "Portland Cement: its Nature, Tests, and Uses."

6. A Telford Premium, to Maj.-General Scott, C.B., and a Telford Premium to G. R. Redgrave, C.E., for their paper on the "Manufacture and Testing of Portland Cement."

7. A Telford Premium, to C. J. Wood, C.E., for his paper on "Tunnel Outlets from Storage Reservoirs."

8. A Telford Premium, to W. H. Delano, C.E., for his paper on "The Use of Asphalt and Mineral Bitumen in Engineering."

9. The Manby Premium, to G. Chatterton, M.A., C.E., for his paper on "The Main Drainage of Torquay."

FOR PAPERS PRINTED IN THE PROCEEDINGS WITHOUT BEING DISCUSSED.

1. A Telford Medal and a Telford Premium, to B. Baker, C.E., for his papers on "The River Nile," "Cleopatra's Needle," and "The Practical Strength of Beams."

2. A Telford Medal and a Telford Premium, to J. Lucas, for his paper on "The Hydrogeology of the Lower Greensands of Surrey and Hampshire."

3. A Telford Premium, to Haroo T. H. Siccama, C.E., for his paper on "The Delta of the Rhine and the Meuse in the Netherlands."

4. A Telford Premium, to J. Miller Wilson, C.E., for his "Description of a Bridge over the Monongahela River, at Port Ferry, Pennsylvania."

* Have previously received Telford medals.

5. A Telford Premium, to F. Eliot Duckham, C.E., for his paper on "The Thames Steam Ferry between Wapping and Rotherhithe."

6. A Telford Premium, to George Moyle, for his paper on "The Platelaying of the Jacobabad or broad-gauge section of the Candahar Railway."

## THE GAS EXPLOSION.

AT a meeting of the St. Pancras Committee of Works, on Monday evening last, a report was received from the sub-committee appointed last week, stating that they had instructed Mr. W. B. Scott, the chief surveyor, and Mr. Gibb, the vestry clerk, to put themselves in communication with the secretary of the Chartered Gas Company. In reply to a letter addressed to the gas company, the following answer had been received:—

"On the subject of your letter of the 7th inst. I am directed to say in reply that, while the company do not, under existing circumstances, admit their liability for the damage occasioned by the late explosions, yet with a view of carrying out without delay the works and repairs necessary to be done to the houses, streets, and sewers in your parish injured by the explosion, Messrs. Aird & Sons, the contractors, have received instructions forthwith to place themselves in communication with Mr. Scott, your surveyor, to arrange with him as to what is required to be done by them to carry out the works on behalf of the company."

The chief surveyor had accordingly put himself in communication with the contractors, and a clerk of the works had been appointed to supervise the proper execution of the necessary works. The report was approved and ordered to be forwarded to the Vestry.

The coroner's jury have found the following verdict:—

"That the deaths of Burr and Beavis were caused by explosion, that explosion being caused by a light ignorantly placed to the pipe on the main by Hawks, the gas having been introduced into the new main by some defect in the valve in Howland-street. The jury are further of opinion that additional care should be taken by the Gas Light and Coke Company in the testing of new mains."

The Coroner remarked that the valve might have been opened by misadventure, and, if so, the verdict would not cover that.

The jury replied that the opening of the valve would be a defect. They had thoroughly considered all the points, and they would not alter the terms of their verdict.

Similar explosions, strange to say, occurred in Wolverhampton on Tuesday last. Happily no lives were lost.

## SIZE AND PROPORTION.

SIR,—I quite agree with your correspondent "B." that you are right in allowing questions such as that mooted by "Torenticos" to find a place in your journal. The columns of the *Builder* have, indeed, always been open to those who have felt strongly upon art or any other topic. But the advantage to the public has inhered in that you have also permitted any new notion to be "bolted to the bran" by discussion.

In my several letters I have suggested means for testing the truth of the hypothesis put forward by your correspondent, but I usually reserve the full strength of an opposing argument for the *coup de grace*. Now, sir, it may be gathered from the internal evidence of the letters of "Torenticos" that he is a great stickler for proportions, for proportion *à l'outrance*,—for proportion to the millionth of a minim. Were these exact proportions, may I ask, determined by the Greeks as proportions of fitness in the human figure? or were they worked out from the Grecian "moral consciousness," as the German is said to have worked out his camel? Clearly the former. But what does your correspondent, the stickler for proportion to a minim, do? Nothing more nor less than knock down what he would build up by contending for the introduction of some variable quantity to be substituted at the taste of the artist, instead of the exact proportions, to minims, worked out by the scientific Greeks. A science of the proportions of the human figure would, under such complex conditions, be impossible. All such fanciful expedients for avoiding correctness are, to my mind, of the same order, though, perhaps, somewhat different in degree to that adopted by the Egyptian artists who represented the Life Guards of Heliopolis, with both legs on the pictured side of their horses, to counteract the effect of one being obscured in nature to the spectator's view. We might as well increase the diameters of the tops of columns to counteract the effects of perspective.

And, finally, I may add there is an entire absence of any sufficient reason for increasing one section of the body, the head, and no other. Why not the foot? Every section of a reduced copy of any statue, in the absence of any special and sufficient reason to the contrary, would have an equal claim to the enlargement, and thus by a parity of reason we should come to the conclusion that the just proportions of the original should be maintained in their integrity in the reduced copy. METER.

## THE BRITISH MUSEUM.

SIR,—With reference to the remarks upon this subject in the *Builder* of the 10th July inst., it merits notice that it has been necessary to remove some useful books from the shelves in the Reading-room,—several shelves of Bohn's volumes, for instance,—in consequence of some of them having been purloined by dishonest readers. The shelves were vacant for some months, but now they are filled with dry books relative to Parliamentary proceedings. For some months, Murray's Guide Books were removed from their shelf, but they are now restored. Since Mr. Bond's appointment as the chief librarian, beneficial rules have been introduced, and the electric light is a boon, decidedly. There is, I think, room for improvement even now, although, upon the whole, the Reading-room s convenient and well conducted, and the additional reference-books are valuable.

I think that all publications should be bound so as to be ready for use within six months from their publication; as to periodicals, within six months from their completion. I think, also, that publishers should not be allowed to have a discretionary power as to what works they send to the Museum under the Copyright Act. It is a fact that some publishers evade this Act habitually, as is stated in Mr. Cowtan's "Memoirs of the British Museum." Now, if some of these gentlemen were summoned by the solicitors to the Museum for evading the Act, and fined, there would be more alacrity by the trade and less disappointment would be experienced by the readers, especially with reference to the periodicals. The printed catalogues of books now in course of publication are a decided improvement, and I hope they may be continued. Some years since, in the *Builder*, I referred to the Ordnance maps in the Museum (see *Builder*, No. 1,466, vol. xxix.). The red folio catalogues contain a list of many of these, but they are incomplete. Consequently, a reader may suppose that maps are not in the Museum which, in fact, are there. A complete catalogue is necessary for reference. There is a valuable collection of newspaper literature in the library, which, as to certain journals, at least, should be kept up regularly. The catalogues of them, so far as this century is concerned, are loose and incomplete, and a printed list of nineteenth-century journals also would be useful and worthy of the national repository. C. C.

## OPENING-UP WESTMINSTER.

SIR,—Any one who knows Westminster, or lives in Pimlico, must have felt the urgent necessity there is for better and easier communication between these places. At present one is obliged to go from one to the other through a most objectionable locality by a tortuous route, very difficult to ordinary strangers to find, and disagreeable to ladies and old people to have to use habitually. Going home late at night by hansom, the favourite route of the cab fraternity seems to be out of Victoria-street by Artillery-row, dashing round a sharp and dangerous corner through a narrow way, styled Old Rochester-row, into Rochester-row itself. During the session of Parliament there is a great traffic of cabs all through the night, more or less. It is just this point of the route which requires diversion and making more direct, and a short new street continuing Artillery-row is all that is required to remedy the evil. This new street, in another point of view, would be a desirable improvement, opening-up a vista to one of the most picturesque architectural groups in the locality, viz., St. Stephen's Church and Schools, built and endowed by the munificence of the Baroness Burdett Coutts. This alteration would require merely the diversion and part destruction of a narrow street of small dwelling-houses, which would certainly pay to remove to make room for something better.

A considerable traffic has been set going by

the Army and Navy Co-operative Stores, which have done so much for the enlivenment of Victoria-street,—until lately one of the most dreary and forbidding streets in the metropolis to the unhappy pedestrian, especially after dark. A. S. E.

## ROYAL LONDON PANORAMA.

SIR,—Referring to a report of an action by Mr. E. L. Paraire, for the winding up of the Alcazar Company, which appeared in the last issue of the *Builder*, and from which it might appear that the building now in course of construction, on the site in Leicester-square, formerly occupied by Saville House, is for the Alcazar Company, permit me to state that the building now erecting is for the Royal London Panorama, of 14, Avenue de l'Opéra, Paris, and is being carried out from the designs of M. L. Dumoulin, architect, of Paris, under my superintendence.

ALFRED BOVILL.

SIR,—A sentence in your report of the above matter reads somewhat prejudicially to my position as architect to the company. It is stated that the directors of the Alcazar have entered into negotiations with another architect. This is not correct. The facts are as follows:—The directors of the Alcazar, departing from the object of the original prospectus,—which comprised a theatre, a *café*, and a *restaurant*,—let the site to a French company, who at once assigned their agreement to another French company, who made over their interest to somebody else. None of these companies are registered in England, nor have they any known office or representative. This peculiar French combination employed their own architect, Monsieur Dumoulin, to design and superintend the building of a panorama and bazaar. This is the building now in course of erection, and which it is probable will be completed by October next.

The directors of the Alcazar have nothing to do with the merits of the scheme. They are to receive 3,000*l.* per annum ground-rent. Beyond this the shareholders need anticipate no further profit. EDWARD L. PARAIRE.

## PEOPLE'S ENTERTAINMENT SOCIETY.

AN evening concert was given in the Grosvenor Gallery (by kind permission of Sir Coutts Lindsay, bart.), in aid of the funds of this society, on Thursday, July 15th, in presence of a distinguished audience. The performers were all amateurs, and included Viscountess Folkestone, Mrs. Ronalds, Miss Wakefield, Miss Brough, Mr. L. d'Egville, Mr. Charles Wade, and Mr. C. Bethune. The objects of this society, which is scarcely so well known as might be desired, is to provide good amusement for the poorer classes in London during the winter, in the hope of withdrawing them from lower places of resort. Its first entertainment took place on January 2nd, 1879. At some places the admission is free, while at others a small charge is made. The entertainments have been attended with a very encouraging amount of success, the audiences varying in number from 200 to 600, and the halls and rooms being as a rule well filled. At the termination of a series of weekly entertainments given at Battersea, where the audience was composed of working men exclusively, an address was presented to the members of the society, signed by 200 men, testifying to their appreciation of the efforts made by the society on their behalf. On the 2nd of last January the first of a new series was commenced at Lambeth, in a large room placed at the disposal of the society by the Messrs. Doulton, when about 700 persons were present. At Westminster a local society has been started. Three new series of entertainments are now being organised in other thickly-populated districts, with an entrance charge of twopence, so that shortly the society will have six or seven different entertainments every week. Subscriptions are needed, and may be sent to 180, Brompton-road. In no better way can our less fortunate brethren be aided than by affording them high-class amusement. This is a sort of kindness which has no tendency to destroy the independence and self-respect of the recipients. The society was originated by Mr. C. C. Bethune, who has devoted himself to it for two winters, attending sometimes three or four entertainments every week. The committee list includes many distinguished and well-known names.

**The Builders' Benevolent Institution.**—It has been felt for some time past that this institution would be doing much more good if the annuity paid to the pensioners was increased, so as to place them in a comparatively comfortable position. To carry out this excellent purpose, and to maintain an equal number of pensioners as are now on the funds of the institution, additional subscriptions or donations would have to be obtained; and at the annual general meeting, which is to take place at Willis's Rooms, on the 29th of July, it is proposed to consider the desirability of endeavouring to effect this change. We trust the promoters of it will be successful.

## CHURCH-BUILDING NEWS.

*Fulham.*—On the 10th inst. the corner stone of the new parish church of Fulham was laid by the Archbishop of Canterbury. The old building now being pulled down has neither age nor beauty to recommend it, and is, in fact, less interesting than the churchyard, which, in spite of the growth of London, still keeps its rural character. Several Bishops of London have been buried here:—Dr. King, in 1621; Dr. Compton, in 1713; Dr. Robinson, in 1723; Dr. Gibson, in 1743; Dr. Sherlock, in 1761; Dr. Lowth, in 1787; and Dr. Blomfield, in 1857. Here, too, under the lime trees, is the grave of Theodore Hook, "of infinite jest, of most excellent fancy." The new church will be built in the Perpendicular style, from the designs of Mr. A. W. Blomfield, M.A., who will give the east window in memory of his father, the late Bishop; but the old tower, with its pleasant peal of bells, will remain untouched. A view of this tower, as restored under the direction of the conductor of this journal, will be found in our volume for 1846. The dimensions of the nave are as follow:—Height, 48 ft.; length, 71 ft. 3 in.; width, aisles included, 56 ft. There are also north and south transepts to chancel, divided by arcades. There is also a vestry on the north side, and organ-chamber on the south side. The dimensions of the chancel are,—Height, 39 ft.; length, 35 ft.; width, transepts included, 63 ft. The new floor of the nave will be 2 ft. 9 in. above the old one, on account of the old church having been inundated with water upon several occasions, owing to the floor having been so much lower than the ground line. The walls throughout are composed of Kentish Rag facing outside; stock-brick faced inside, and to be plastered in rough stucco; the middles of the walls are filled in with Portland cement concrete. The dressings are of Bath stone, both inside and out. The roofs are open-timbered, and constructed of pitch-pine, boarded on backs of rafters, and covered with green Eureka slates. The style of the building is Perpendicular. The total cost will be 8,000*l.*, exclusive of Grundy's heating apparatus. Messrs. Goddard & Sons, of Farnham and Dorking, are the contractors, the work being under the superintendence of Mr. J. Vaughan, clerk of works.

*Exeter.*—A meeting of the parishioners of the united parishes of St. Petrock and St. Kerrian have adopted plans for certain alterations at St. Petrock's Church. According to the rector, the church was first built in the reign of the Conqueror. At that time the church consisted of a chancel, nave, north aisle, and tower. What became of the north aisle no one knew. In 1413 the south aisle was added, and about a century afterwards it was further extended in the direction of the Cathedral Close. This it was that gave the church its present unique and unparalleled shape. He had never before seen any church in which two-thirds at least of the worshippers were unable to see the Communion-table, or hear anything that was said there, and where the people sat looking five or six ways at once. Nothing was done from 1413 until 1828, when in that year several changes were made. A new chancel-arch was added, the church was entirely re-seated, and the pulpit, reading-desk, and wainscoting were altered and repaired. It is now proposed to reseat the church, and to carry out other works for the comfort of the congregation.

*Four Elms.*—On the 24th ult. the foundation-stone of a new church, at Four Elms, Kent, was laid by Mr. S. Williams, of Shirley. The external facing will be of Limpsfield stone, while the quoins, window and other dressings, and the internal facings, will be of Bath stone. Messrs. Punnett, of Tunbridge, are the contractors; and the architect is Mr. Edwin T. Hall, of London.

*Gatley-in-Etchells.*—The foundation-stone of the new Church of St. James, Gatley-in-Etchells, was laid on the 10th inst. by Mr. W. Cunliffe Brooks, M.P. The church will stand in a conspicuous position at the easterly end of Gatley Green, on a site adjoining the National Schools, its westerly front facing the main approach from Handforth and Wilmslow. The design comprises a nave, 31 ft. wide, the western end of it being narrowed so as to form a kind of narthex, and in the middle of this narthex, and projecting some 5 ft. westwards, is an octagonal-shaped baptistery, its walls rising some 33 ft. from the ground, and being covered with a semicircular roof. The tower, which will be gabled to the west and east, is "saddle-backed." The total height to the top of the tower will be about 70 ft. The chancel will be about 18 ft. wide and 25 ft. long, and will terminate apsidally, the angles of the apse being those of a hexagon. To the south of the chancel will be the organ-chamber, vestry, and the boiler-house. The total length of the building externally will be about 90 ft. Accommodation will be provided for about 250 worshippers, and provision is made in the design for enlargement by means of a future south aisle. The walls externally and internally will be faced with bricks of a greyish colour, with dressings of stone and stock bricks. Moulded bricks will be used in the arches and in the label-moulds and strings. In the inside of the church there will be a few white bricks in the arches, bands, &c. The roofs will be slated. The church is being built in sections, the present contract for the nave, organ-chamber, and vestry, including the bottom stage of the tower, having been let to Mr. Thomas Darnborough, of Rusholme. The architects are Messrs. Medland & Henry Taylor, of Manchester.

*Clerkenwell.*—At a public meeting of the inhabitants, held recently, it was resolved that it was not advisable to enlarge and finish the Martyrs' Memorial Church, St. John-street-road, according to the original design, as it would entail a cost of at least 2,500*l.*; but that the design submitted by Mr. Jesse C. Hukins be adopted instead, involving a cost of only 1,600*l.*; and that an immediate attempt should be made to collect that sum, and to build the organ-chamber, south transept, aisle, and door upon the portion of the ground given for that purpose by the Marquis of Northampton. The church was built from designs by Mr. E. L. Blackburne, architect.

*Bideford.*—A temporary iron church has been erected and opened at East-the-Water, as an adjunct to the Bideford parish church. The plans were prepared and the building erected by Mr. J. C. Hawes, London. The building is of corrugated galvanised iron on a brick foundation, and is 55 ft. long by 26 ft. wide and 28 ft. high in the nave, and 17 ft. by 15 ft. in the chancel.

## Miscellanea.

**A Photographic Phenomenon.**—An interesting phenomenon in photography has been announced by M. Janssen, in a note to the Académie des Sciences. While obtaining solar images at Meudon, he has observed that when the exposure is prolonged beyond a certain period, in which a good negative image is got, this image loses its distinctness, and the plate passes into a neutral state,—*i.e.*, no appreciable image appears on use of a developer. But if the exposure be continued still further, the negative image gives place to a positive, in which the distribution of light and shade is exactly the opposite, and this image, if the luminous action be well regulated, presents all the details and fineness of the one it has supplanted. With further exposure a second neutral state is reached, opposite to the first, inasmuch as if the latter showed the image uniformly dark, the former shows it uniformly light. For solar negatives taken at Meudon, the time of exposure has rarely exceeded 1-1,000th of a second, if the photospheric granulations were to be obtained; and with plates prepared by the gelatino-bromide process, the time may be reduced to 1-20,000th of a second, or less. Now, if one of these dry plates be exposed half a second, or a second, a distinct positive image is produced, the body of the sun appearing white and the spots black, as they do to the eye. M. Janssen has similarly obtained positive images of landscapes, appearing transparently as the scene is viewed naturally; also a view of the park at Meudon, showing a white solar disc on the dark background of the sky, and counter types, which are of the same sign as the original type,—*i.e.*, positive if the type be positive, and negative if it be negative. In these photographs it is the same spectral rays that have first given the negative image, and then effected its transformation into a positive.

**Sedgley.**—Board schools to accommodate 450 children have been opened at Red Hall. The schools and playground extend over 4,000 square yards. There are three departments, each capable of accommodating 150 children. The buildings have been erected by Mr. Horton, of Brierley Hill, from the plans of Mr. A. P. Brevitt, architect, Darlaston, at a cost of 3,300*l.*

**Floods in London.**—At the meeting of the Metropolitan Board of Works, on the 9th inst., four deputations attended in reference to the floodings which have occurred in the northern districts of the metropolis. The first two deputations were from the Vestry of Islington and inhabitants of Holloway, to present memorials praying the Board to expedite the intended works for the storm and relief line of sewer for Holloway and Kentish-town, so as to prevent as far as possible further repetitions of the overflows of sewage matter and water into the houses in the parish of Islington and Holloway. The deputations were introduced by Mr. Eit. Mr. Brodfield, in support of the memorials, said that when the main drainage works for the northern part of the metropolis were constructed, the inhabited houses in Islington numbered 20,000, but the number assessed at the present time was 37,000; and the districts of Upper Holloway, Lower Holloway, and Highbury comprised as many houses as constituted the whole parish of Islington twenty years ago. In 1878 these districts were seriously affected by the overflow from the sewers, and particularly on the 23rd of June in that year, when one-third of a mile of the Holloway-road was flooded with sewage water, which flowed into the shops, houses, and premises. In the present year there had been several repetitions of the floods of 1878, and the inhabitants of the houses had suffered seriously from damage to their goods and properties, while the sewage matter was most dangerous to health. They prayed, therefore, that the Board would at once proceed with the contemplated measures for their relief. Two other deputations were introduced by Mr. Furniss and Mr. Watkins from the Vestry of St. Pancras, and inhabitants of the northern part of the parish of St. Pancras, to present similar memorials. The memorials were referred to the Works and General Purposes Committee.

**A Large Building Society.**—At the twenty-ninth annual meeting of the Birkbeck Building Society, held Thursday, July 8th, in the theatre of the Birkbeck Literary Institution, the report presented to the meeting stated that the receipts for the year ending the 31st March last were 5,709,932*l.*, and the total from the commencement of the Society 49,794,824*l.* The deposits reached the large sum of 5,132,924. The gross profits earned by the Society amounted to 102,802*l.*, of which 86,586*l.* have been appropriated to the payment of interest on shares and deposits, discount and expenses of management, leaving a net profit of 16,216*l.* The surplus funds amount at the present time to 1,966,296*l.*, of which 300,458*l.* is invested in Consols, New Three per Cents., and Exchequer and Treasury Bills; 219,275*l.* in Metropolitan Board of Works and India Stocks; 542,757*l.* in Colonial Bonds; 76,693*l.* in Railway Debentures; 125,145*l.* in French Treasury Bills, Foreign Railway Obligations, Bonds, &c.; 306,109*l.* in gas, water, and miscellaneous securities; 214,914*l.* in freehold ground-rents; while 180,943*l.* is in cash. It is worthy of note that no portion of the funds appear to be invested in promissory notes, bills of exchange, or personal securities of any kind. The total liabilities of the Society are 2,465,819*l.*, while the assets are 2,583,331*l.*, showing a net surplus of 117,512*l.* Of this sum 50,000*l.* is invested in Consols as a permanent guarantee fund, leaving 67,512*l.* to be carried forward to await the next declaration of a bonus.

**The Obelisk.**—At the meeting of the Metropolitan Board of Works, on the 9th inst., a report was presented from the Works and General Purposes Committee stating that, in pursuance of the resolution of the Board of the 13th of June, 1879, a model of one of the sphinxes to be placed on the pedestals at the sides of the Egyptian obelisk on the Victoria Embankment, and models of the proposed additions to the obelisk, had been placed in position, and recommending that the models be approved, and that it be referred back to the committee to take all necessary steps for having the sphinxes and additions cast in bronze. Mr. E. Dresser Rogers, in moving the adoption of the report, said it was intended to cover the obelisk with the silicate paint of the Indestructible Paint Company for preservation, and also to apply lightning-conductors. The report was adopted.

**Fire.**—On the night of the 7th inst. the steam sawing and moulding mills of Mr. Davis, adjoining the Lawrence Hill station, Bristol, together with the expensive machinery, stock, &c., were entirely destroyed by fire.

**The Site of Horsemonger-lane Gaol** will not, according to present appearances, be obtained by the denisens of Southwark as an open space. A report submitted by the Works and General Purposes Committee to the Metropolitan Board of Works, on the 9th inst., stated that on the 28th of May last the Board referred it to the committee to open further negotiations with the justices of Surrey, with a view of ascertaining what price they would accept for the site of Horsemonger-lane Gaol. The committee had since been in communication with the Clerk of the Peace, and had now to report that they had received a letter from him stating that the justices would be willing to accept 18,000*l.* for that portion of the site of the gaol which was offered for sale on the 19th of May, subject to the conditions of sale used on that occasion. The sum named by the justices was, however, the committee regretted to say, beyond that which they would feel justified in advising the Board to pay, and they recommended, therefore, that the offer be declined. Mr. Dresser-Rogers, in proposing the adoption of the report, said he regretted exceedingly that the price asked, 18,000*l.*, for something less than an acre and a half of land, was not a price which the Board would be prepared to give. The committee had viewed the spot, and they were sorry to find that the justices thought of taking a large portion of the area now uncovered for their own purposes, and the space left would be so small, and the price asked so very high, that the Board could not think of proceeding further in the matter. The recommendation of the committee was adopted.

**Social Science Congress.**—Lord Reay has accepted the office of President of the Social Science Congress at its approaching meeting in Edinburgh. The Congress, as at present arranged, is to meet on the 6th of October, the closing meeting being held on the 13th of that month. The Arrangements Committee has nominated the following gentlemen to be the secretaries of the different departments, viz., I. Jurisprudence,—(1) International and Municipal Law section,—Mr. J. A. Reid, advocate, and Mr. J. Barker Duncan, Writer to the Signet; (2) Repression of Crime section,—Mr. Chas. Scott and Mr. J. M. Gibson, advocates. II. Education,—Dr. Pryde and Dr. Robertson. III. Health,—Dr. Littlejohn and Dr. Stevenson Macadam. IV. Economy and Trade,—Ex-Treasurer Wilson and Mr. John Harrison; and V. Art,—Mr. J. M. Barclay, R.S.A., Mr. Arch. Constable, and Mr. Alexander Ballantine. In connexion with the Congress, arrangements are being made by the Royal Scottish Academy for opening an exhibition illustrative of Scottish art. While living painters of standing will be invited to contribute, it is expected that nearly 200 pictures by deceased artists will be obtained on loan.

**The Proposed Art Gallery for Birmingham.**—The Art Gallery movement in Birmingham has received an additional stimulus by the encouraging announcement of the purchase, expressly for presentation to the town, of Mr. John Bragg's noted collection of Wedgwood ware, valued at 2,000*l.* The gift (says the *Birmingham Gazette*) has a special value, as unsuccessful efforts have previously been made to secure to the town by means of a subscription the unique collection which it will now obtain through the wise and thoughtful generosity of a private individual. The name of the donor will not be made known for the present, but this will not be the first of his benefactions. To the art-workers of Birmingham the donation will be an inestimable treasure. Another addition to the Art Gallery is the picture, "George Dawson and his Friends," which was painted by the late Mr. Ernest Thompson, of Birmingham, and purchased by public subscription. The picture has just been presented to the Free Libraries Committee for exhibition in the Art Gallery.

**Driffield.**—A new Wesleyan Chapel was opened at Driffield on the 7th inst. The cost has been over 5,000*l.*, and the contractors were:—Stonework, Mr. Sweeting, Hull; woodwork, Mr. Barnes, Beverley; brickwork, Mr. Gage, Driffield; and Mr. J. F. Shepherdson, of Driffield, has acted as clerk of works for the architect, Mr. H. J. Paull, of London and Manchester.

**Messrs. Doulton & Co.** have obtained at the Sydney International Exhibition four first-class awards for their sanitary ware, vitrified stoneware drain-pipes, crucibles, melting-pots, &c., and art ware, besides awards for other manufactures.

**In the "Whitehall Review,"** for the future, the portraits of ladies, which have long formed an important feature of the paper, will be drawn from the life by the Chevalier Desanges, the painter of "A Royal Garden Party at Chiswick." Lady Poltimore's will be the first portrait given.

**New Parochial Offices, Westminster.**—In this competition, Mr. Charles Barry has consented to act as professional adviser to the committee. The desire that the Press should abstain from giving any notice of the designs submitted is still expressed.

**Cast Steel Bells.**—We have been asked more than once for information as to cast-steel bells. A trade-book just now issued by Messrs. Vickers, Sons, and Co., of Sheffield, gives all the particulars that can be desired.

## TENDERS

For new warehouses, Queen's-road, Bayswater, for Mr. W. Whiteley. Mr. J. E. Saunders, architect. Quantities by Messrs. Osborn & Russell:—

| | |
|---|---|
| Cubitt & Co. | £99,824 0 0 |
| Holland & Hannen | 99,210 0 0 |
| Adamson | 96,415 0 0 |
| Ashby & Horner | 93,890 0 0 |
| Hall, Beddall, & Co. | 92,760 0 0 |
| Brass | 88,645 0 0 |

For the sewers, making up, and kerbing, &c., of Spencer-road, Bolton-road, Hartington-road, and Devonshire-gardens, Grove-park, for the Chiswick Improvement Commissioners. Mr. H. O. Smith, surveyor:—

| | |
|---|---|
| Mears | £3,162 0 0 |
| Alldred | 3,135 10 0 |
| Nowell & Robson | 2,800 0 0 |
| Burford & Ball | 2,783 0 0 |
| Marshall | 2,782 10 0 |
| Acock | 2,685 18 6 |
| Isles | 2,639 0 0 |
| Huggett & Wilson | 2,573 14 9 |
| Ward & Torkington | 2,462 0 0 |
| Neal (accepted) | 2,461 6 11 |

For a residence at Woburn Sands, Bucks. Mr. Fredk. Gotto, architect:—

| | |
|---|---|
| Young | £430 0 0 |
| E. Smith & Son | 417 0 0 |
| Whiting (accepted) | 389 0 0 |

For pair of semi-detached houses in Wimbledon-park, for Mr. W. Everett. Mr. J. G. Gibbins, architect:—

| | |
|---|---|
| Falkner | £3,975 0 0 |
| Fisher | 3,574 0 0 |
| Wood | 3,224 0 0 |
| Deacon (accepted) | 3,092 0 0 |

For Infectious Hospital, Hillingdon, for the Uxbridge Local Board:—

| | |
|---|---|
| Holland, Poplar | £2,000 0 0 |
| Crowe, Hereford | 1,995 0 0 |
| Scott, Ealing | 1,951 0 0 |
| W. Reaves, Windsor | 1,940 0 0 |
| G. Reaves, Windsor | 1,926 0 0 |
| Hardy, Cowley | 1,839 0 0 |
| Taylor, Uxbridge | 1,698 0 0 |
| Harold, Finsbury | 1,622 0 0 |
| Kearley, Uxbridge | 1,552 0 0 |
| Bull, Cooper, & Co., Chelsea | 1,539 0 0 |
| Bagley, Beaconsfield | 1,497 0 0 |
| Haynes, Harrow | 1,427 0 0 |
| Pratt, Hillingdon | 1,421 0 0 |
| Bebington, Uxbridge (accepted) | 1,390 0 0 |
| Garrett, Uxbridge | 1,333 0 0 |

For four sale shops and houses, Derby-road, Nottingham. Messrs. S. Dutton Walker & Howitt, architects:—

| | |
|---|---|
| Marriott & Wartnaby | £3,460 0 0 |
| Bell & Son | 3,320 0 0 |
| McCulloch | 3,140 0 0 |
| Fish | 3,067 0 0 |
| Hind | 3,025 0 0 |
| Vickers | 2,999 0 0 |
| Jelley | 2,980 0 0 |
| Wheatley & Maule | 2,971 0 0 |
| Woolf, Bros. | 2,920 0 0 |
| Clarke | 2,914 0 0 |
| Fox | 2,904 0 0 |
| Bailey | 2,860 0 0 |
| Henshaw | 2,853 17 0 |
| Lynam | 2,851 0 0 |
| Hodson & Facon | 2,839 0 0 |
| Messom (accepted), Talbot-street, Nottingham | 2,815 0 |

For the erection of stables and coach-houses on the Bolingbroke-grove estate, Wandsworth-common, for Mr. E. Appleby. Mr. E. R. Robson, architect. Quantities not supplied.

| | |
|---|---|
| W. Johnson (accepted) | £747 10 0 |

For the erection of a house on the Earlsfield estate, Wandsworth-common, for Mr. Archibald Little. Mr. J. T. Lynes, architect. Quantities supplied by Mr. W. E. Stoner:—

| | |
|---|---|
| Parsons | £1,770 0 0 |
| Gibbs | 1,734 0 0 |
| Pain | 1,723 0 0 |
| Robinson | 1,600 0 0 |
| Turtle & Appleton | 1,585 0 0 |
| Lorden | 1,575 0 0 |
| Williams | 1,560 0 0 |
| Johnson (accepted) | 1,510 19 6½ |

For sundry alterations and repairs at The Elms, Trinity-road, Wandsworth-common, for Mr. C. W. Wheatley:—

| | |
|---|---|
| Johnson (accepted) | £210 2 0 |

For the erection of boundary-wall and entrance-gates, &c., in Nightingale-lane, Clapham-common, for Mr. Brookes. Mr. J. Weir, architect. Quantities not supplied:—

| | |
|---|---|
| Ansell | £451 0 0 |
| Lathey, Bros. | 339 0 0 |
| Johnson (accepted, with revision) | 311 7 0 |

For the erection of a detached villa on the St. James-road, Wandsworth-common, for Mr. H. Privett:—

| | |
|---|---|
| Johnson (accepted) | £836 0 0 |

For the Bells, Drury-lane. Mr. W. H. Scrymgeour, architect:—

| | |
|---|---|
| Martin, Wells, & Co. | £5,500 0 0 |
| Dunford & Langham | 5,495 0 0 |
| Martin | 5,450 0 0 |
| Watson | 5,429 0 0 |

For restoration of main part of mansion, Watlington-park, Oxon, for Mr. J. T. Symons-Jeune. Mr. Arthur Vernon, architect:—

| | |
|---|---|
| Silver | £1,874 0 0 |
| Holland | 1,749 0 0 |
| Cooper | 1,745 10 0 |
| Woodbridge (accepted) | 1,673 0 0 |

For rebuilding premises in the Poultry. Messrs. Ford & Hesketh, architects:—

| | |
|---|---|
| Scrivener & Co. | £3,274 0 0 |
| Dove, Bros. | 3,155 0 0 |
| Mowlem & Co. | 3,123 0 0 |
| Mark | 3,000 0 0 |
| Brass | 2,950 0 0 |
| Macey & Sons | 2,933 0 0 |
| Lawrence | 2,722 0 0 |
| Sabey & Son | 2,717 0 0 |
| Conder | 2,605 0 0 |

For the erection of an entrance lodge, for Mr. W. B. Gater, Belvoir House, Fareham. Mr. J. Burman Rosevear, architect:—

| | |
|---|---|
| Gamblin | £234 7 0 |
| Fullford | 230 0 0 |
| Plummer (accepted) | 228 0 0 |

For a house and shop at Reigate. Mr. T. R. Hooper, architect. Quantities supplied:—

| | |
|---|---|
| Braid & Co. | £1,610 0 0 ! |
| Baguley | 1,600 0 0 |
| Parsons | 1,400 0 0 |
| Cook & Thornton | 1,340 0 0 |
| Winkworth & Worsell | 1,240 0 0 |
| Holmwood | 1,166 0 0 |
| Apted | 1,057 0 0 |
| Waycot (accepted) | 890 0 0! |

For two detached villas, Shepherd's-hill, Crouch-end. Mr. E. J. Paine, architect:—

| | No. 1. | | No. 2. | |
|---|---|---|---|---|
| Goodman | £1,646 0 0 | | £1,875 0 0 | |
| Holmes & Son | 1,549 0 0 | | 1,787 0 0 | |
| Conder | 1,599 0 0 | | 1,713 0 0 | |
| Roberts | 1,461 0 0 | | 1,686 0 0 | |
| Harper | 1,448 0 0 | | 1,617 0 0 | |
| King | 1,360 0 0 | | 1,560 0 0 | |
| Mattock, Bros. | 1,334 0 0 | | 1,426 0 0 | |

For re-building No. 232, Westminster Bridge-road, for Mr. D. Davis. H. W. Sexton, architect. Quantities supplied:—

| | |
|---|---|
| Heard & Co. | £1,767 12 0 |
| Chaffen | 1,550 0 0 |
| Crisp & Tomlin | 1,473 0 0 |
| Elliott | 1,460 0 0 |
| Vaughan | 1,459 0 0 |
| Nichols | 1,430 0 0 |
| Julian & Co. | 1,425 0 0 |
| Beale | 1,387 10 0 |
| J. & H. Cocks | 1,370 0 0 |
| Garrard | 1,357 0 0 |
| Nightingale | 1,352 0 0 |
| Batley | 1,349 0 0 |
| Priestly | 1,340 0 0 |
| Linfield | 1,333 0 0 |
| Russell & Cowley | 1,329 0 0 |
| Whittaker | 1,298 10 0 |
| Judd (accepted) | 1,279 0 0 |
| Hobern (too late) | 1,275 0 0 |

For villa residence at Fitzjohn's-avenue, Hampstead, for Mr. Pettie, R.A. Mr. Wm. Wallace, architect. Quantities by Mr. F. Thomson:—

| | |
|---|---|
| Richardson, Bros | £7,995 0 0 |
| Hunt | 7,645 0 0 |
| Brass | 7,587 0 0 |
| Manley | 7,530 0 0 |
| Scrivener & Co. | 7,490 0 0 |
| White | 7,429 0 0 |
| Woodward | 7,380 0 0 |
| Toms | 7,359 0 0 |
| Cox | 7,274 0 0 |
| Taverner & Son | 7,130 0 0 |
| Dowsing & Sons (accepted) | 6,497 0 0 |

For dwelling-house, Sunninghill, Berks, for Mr. T. Ashby. Mr. Saunders, architect:—

| | |
|---|---|
| Knight | £2,920 0 0 |
| Stimpson | 2,766 0 0 |
| Messom | 2,745 0 0 |
| Pither | 2,722 0 0 |
| Watson | 2,716 0 0 |
| Higgs | 2,459 0 0 |

For Baptist Chapel, New Shoreham, Sussex. Mr. Arthur Loader, architect:—

| | |
|---|---|
| Burstow | £1,278 0 0 |
| Stow | 1,350 0 0 |
| Newnham | 1,230 0 0 |
| Burchell | 1,210 0 0 |
| Curd | 1,210 0 0 |
| Bruton (accepted) | 1,200 0 0 |

For alterations to No. 177, and new shop 178, Western-road, Brighton. Mr. Arthur Loader, architect:—

| | |
|---|---|
| Lockyer | £834 0 0 |
| Newnham | 777 0 0 |
| Bruton | 750 0 0 |
| Dourner | 735 0 0 |

For alterations and repairs to Nos. 4, 5, 6, and 7, Frederick-street, Hampstead-road, for Messrs. Saul. No quantities. First contract:—

| | |
|---|---|
| Purkiss | £1,99 17 0 |
| Temple & Forster | 190 0 0 |
| Whittaker | 180 0 0 |

## TO CORRESPONDENTS.

W. F. H. (Lists of so-called "current prices" are usually misleading and injurious).—F. W. H (if inaccuracy had been pointed out, it would have been corrected).—D. C. J. & Co.—T. H—G.—J. G.—S. B.—E. F. B.—F. G.—G. T.—W. H. W.—T. H.—J. B.—W. P. & E. T.—A. V.—J. R.—C. P.—E. J. S—R.—C. T.—E. S. R.—J. P. S.—F. & H.—E. L. B.—C. R. S—G. G. S.—J. B.—H. J.—P. P. P.—W. S.—T. C.—H. W. S.—R. W. G.—A. L.—J. H—M. E. H.—C. & R—F.—J. W.—W. J. B.—M. T. (no).—J. H. (next week).—The Sufferer (next week).

All statements of facts, lists of tenders, &c. must be accompanied by the name and address of the sender, not necessarily for publication.

We are compelled to decline pointing out books and giving addresses.

NOTE.—The responsibility of signed articles, and papers read at public meetings, rests, of course with the authors.

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